FOOD ENGINEERING

November 1951

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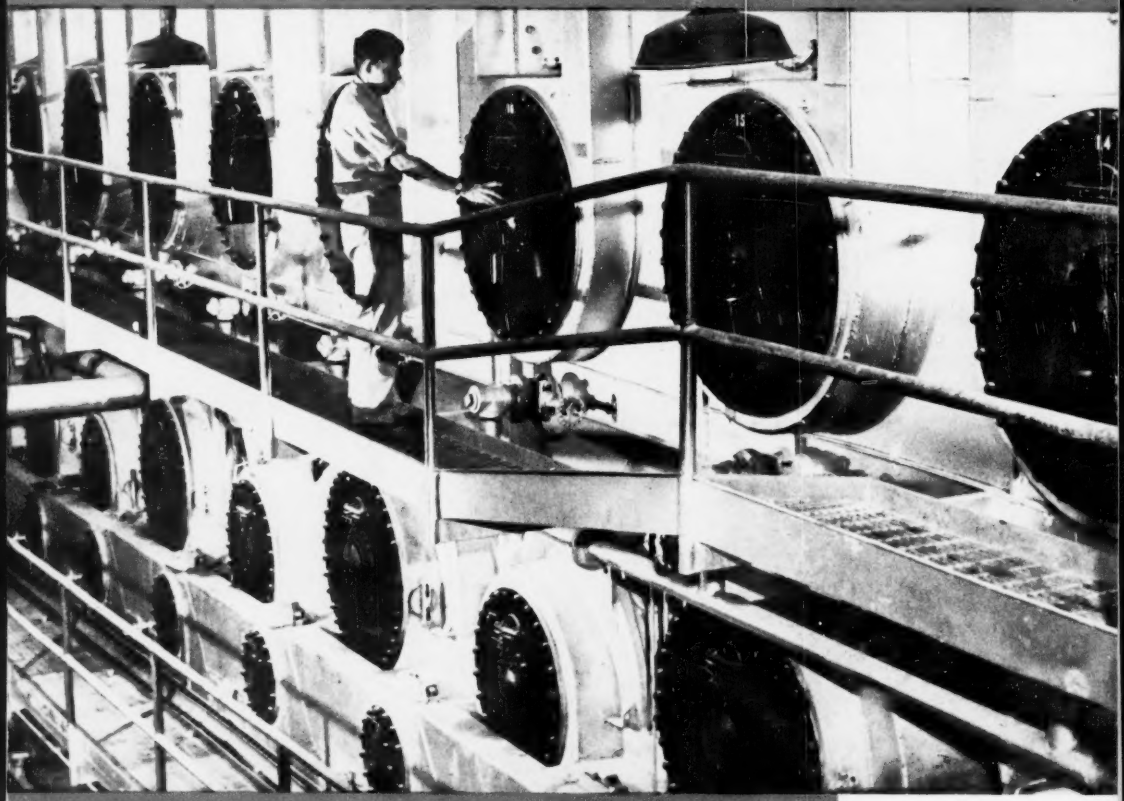
35 CENTS



One of many advanced engineering features in new Holly sugar plant—21-cell continuous diffuser. (Page 93)

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BEE-LINE *labels these fine, old Wines*

You recognize the brand by its attractive label: trim . . . clean . . . smooth . . . precision-applied to proclaim quality.

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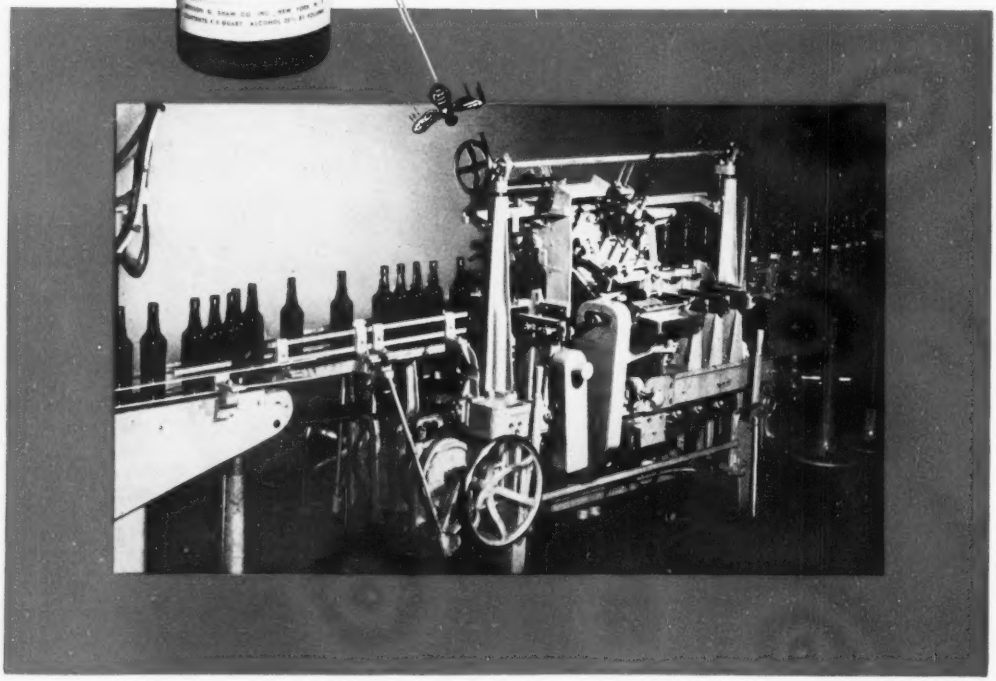

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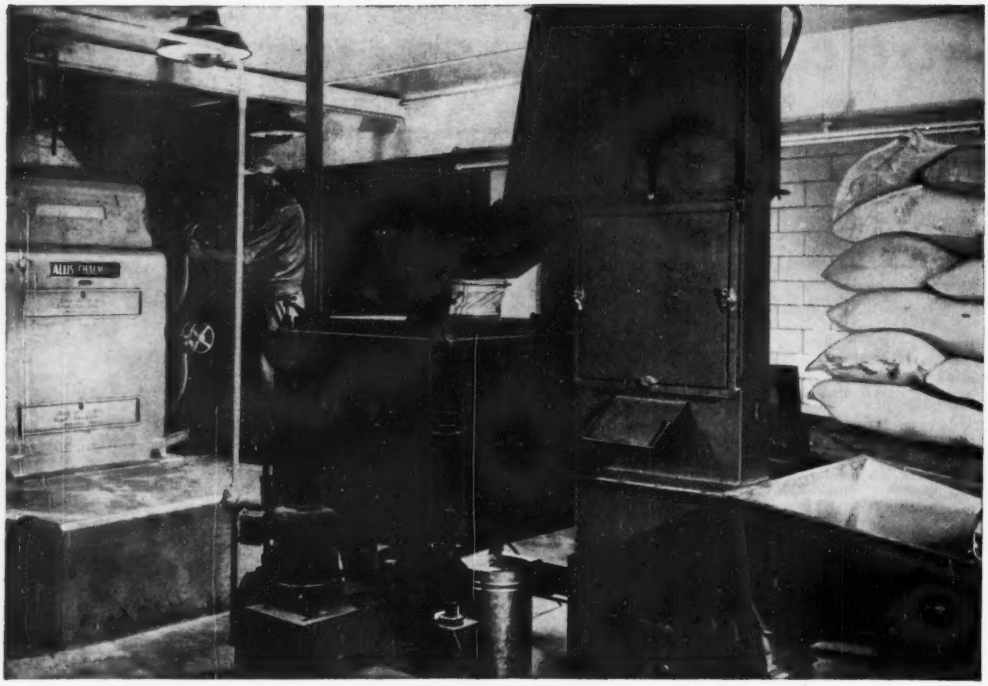


HERE'S A Profit-Producing COMBINATION!

LOW-HEAD Gyratory Sifter and A-C Roller Mill Help Produce Tasty "Cream of Rice" Breakfast Cereal

THIS PROFIT-WINNING TEAM has been in operation for a year and a half at Grocery Store Products, West Chester, Pa. Specifically, the sifter and roller mill have been used for grinding and grading of rice — to a very narrow size range — for "Cream of Rice" breakfast cereal.

Performance records indicate that these Allis-Chalmers machines have provided trouble-free, economical operation since their installation. Routine cleaning and lubrication has been the only maintenance required.

Both machines are of sanitary, all-metal construction — designed for easy cleaning. Sifter is fitted with rubber seals and the roller mill operates under negative air pressure — factors that *minimize* chance for dust buildup in the immediate area of these machines.

But before *any* equipment was purchased, Allis-Chalmers conducted tests in its own research lab — grinding and sifting rice, getting *exact* granulation desired. As a result of these tests, the customer was given the equipment best suited for his particular application.

You, too, can benefit by calling on Allis-Chalmers for food processing equipment or for special milling research on any material you may have. Get full details from our nearby A-C sales office—or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

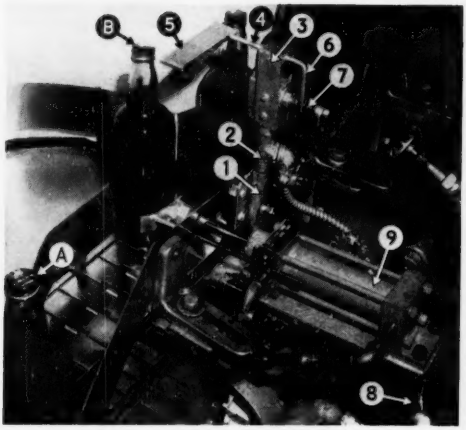
A-3275

Low-Head is an Allis-Chalmers trademark.

ALLIS-CHALMERS

SERVING THE FOOD INDUSTRY FOR 104 YEARS

PRACTICAL IDEAS



Device Polices Capping Operation

A simple mechanism made in our own shop and installed on the packaging line has ended customer complaints concerning improperly applied caps on our wine bottles.

In short, double liners and loose and cross-threaded caps are "out"—for our mechanical policeman catches every badly capped bottle and shoves it off the line.

This is how faulty capping is detected: Beside the conveyor delivering filled and capped bottles (photo), sleeve (1) is attached to support upright post (2). Latter can be positioned in the sleeve at desired height and then secured by use of a bolt, nut, and curved washer fitted in a slot in the sleeve.

Atop the post is a microswitch (3), to the side of which two plates are bolted. These are drilled near the upper edge to serve as bearings for the rocker arm (4).

Now, on the end of this arm is fitted a strip of thin gage metal (5)—the actual detective. It must be carefully made.

First, this strip must extend several inches in the direction of bottle travel, its length depending on the size of the bottles and also on the location of the opening to the reject table.

The strip is so formed that its lowest point is at the end nearest the reject opening.

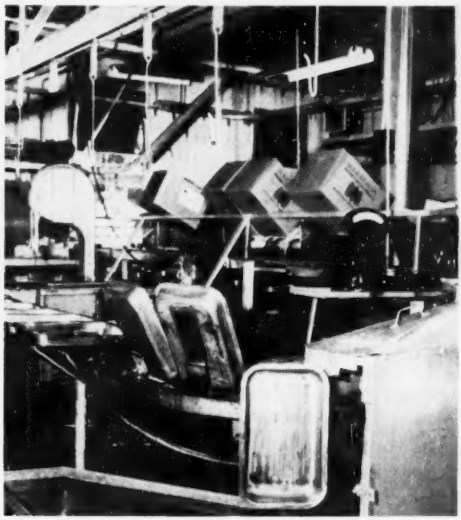
Now to the working sequence: The cap of Bottle A (left in photo) is okay, having passed under strip (5) without tripping the microswitch. But the cross-threaded cap of following Bottle B lifted the detector strip sufficiently to cause the bent down end of rocker arm (6) to trip the microswitch through contact of adjustable screw (7).

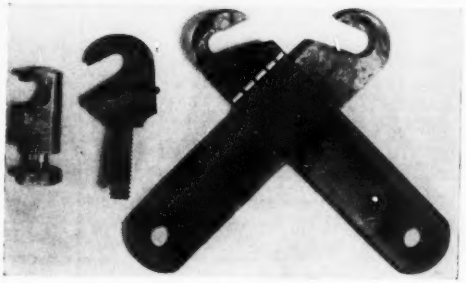
This closed solenoid valve (8), to admit compressed air to cylinder (9). And piston with curved-surface pusher moved out and engaged the defectively capped bottle (seen about to slide onto reject table).

When the piston has pushed the bottle clear, air behind it is exhausted by air entering the front of the cylinder for the return stroke. This air-operated return (faster than spring tension) proved necessary to prevent the piston from interfering with the bottle following a reject.

Microswitch tolerances may be set as close as 4/1000 in., however 25/1000 in. covers GCMI (Glass Container Manufactures Institute) tolerances on the height of our bottles. This set, while liberal, is nevertheless close enough to reject double liners (liner thickness is about 30/1000 in.).

Our Viceroy cylinder operates through a pressure range up to 150 lb. and consumes but little air.—*Harry C. Englefield, Chief Engineer, Danforth Wines Ltd., Toronto, Can.*





Improved Conveying at Lower Cost

No longer is our production interrupted through shearing of one of the clamps that attach foul-eviscerating pans to the conveyor chain.

Solution was use of clamps from another type conveyor. In addition, conveyor maintainance was minimized.

Here is the story: The conveyor to which our pans are anchored is synchronized with an overhead conveyor (see top photo), from which chickens to be eviscerated are suspended. Entrails, deposited in the pans below, accompany each fowl through inspection, following which they are removed from the pans, which then go through a closed spray washer.

The hinges on which the pans swing down for washing are bolted to plates that ride on the conveyor-chain housing. Formerly, brass pins (one is seen at left in second photo) were attached to the underneath side of these plates. It was into the slots in these pins that the conveyor-chain links engaged, to slide the pans along their track.

Returning to top photo, pan hanging upright (fore-

Why it pays to standardize on the Link-Belt BULK-FLO . . . .

The BULK-FLO feeds . . . conveys . . . elevates, providing more profitable handling of hundreds of materials

Difficult-to-handle bulk materials are moved safely and economically with the Bulk-Flo. The Bulk-Flo, most versatile type of conveying medium on the market, serves as a feeder, conveyor and elevator under one drive. The same unit can combine horizontal, vertical and inclined paths, often replacing several units, in less space and at lower cost. Multiple feed and discharge points are practicable. It is completely enclosed—dust tight.

Operating independent of internal pressure, the Bulk-Flo, *with solid flights*, need not be operated at full capacity to provide positive movement of materials. Regardless of the amount of feed, it is self-clearing.

Bulk-Flo provides gentler handling. Because of its solid flights, there are no annoying updrafts of air. Avalanching is eliminated. Variable speed drives are not necessary, because the capacity can be varied by regulating the feed.

You can be sure, when our specialists recommend Bulk-Flo to your engineers or designing contractor, that it is the *right* conveying system for your needs, because Link-Belt makes *all types* of feeding, conveying and elevating machinery—the only complete line on the market today. For all the facts, write for Book 2175.

Full or partially loaded, Link-Belt Bulk-Flo with solid flights provides positive, gentle material handling.

Food handling is easier and safer with BULK-FLO

- Unit is self-clearing, through intermediate runs.
- Dust-tight construction.
- Handles batches on cycle operations.
- No contamination from lubrication.
- Chain and casings can be galvanized or tin-dipped to prevent rust, or made of alloy metals.

LINK-BELT

BULK-FLO
FEEDERS - CONVEYORS - ELEVATORS

Standard combined-run, L-path arrangement Bulk-Flo with single feed opening and front-discharge head section. Side discharge head section may also be used.

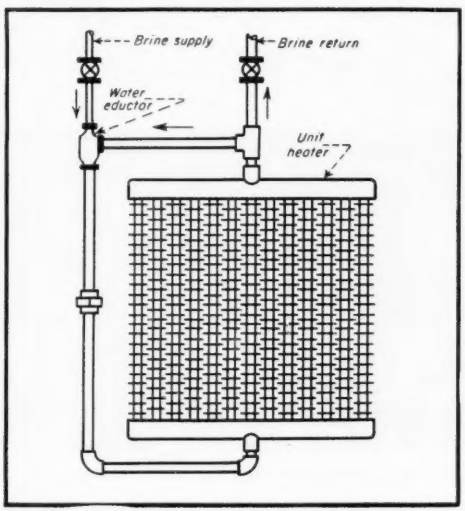
LINK-BELT COMPANY: Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities. 12,302

ground) is just leaving the washer. It rides against a cam-like guide, which is about to lift it for dropping into horizontal position on top of the conveyor. It was when pans were thus forced up by the guides that the pins sheared.

Our different clamp came from the upper conveyor chain, where the chickens are suspended. The tong-like hook which grips links of this upper conveyor is seen at right in the second photo. Note that its slots are not horizontal as are those in the brass pins. Instead, slots are cut on an angle. These steel clamps are tough—they never sheared on the upper conveyor.

Why not replace the one with the other? To do this, tong-hooks were cut with a torch (as indicated by the dotted line). Then the slotted sections were welded to the heads of machine screws and the shoulders reinforced.

When this improved clamp-hook (center in photo) replaced the brass pins, there was no more shearing. The difference can be attributed as much to the angle of the slots as to the toughness of the steel.—*Thomas Ward, Assistant Plant Engineer, C. A. Swanson & Sons, Salisbury, Md.*



Unit Heaters Supply Air-Conditioning

Where refrigerated brine is available, unit heaters that have been used for supplying warmth during cold weather can be converted into air-conditioning units to cool your plant.

The change-over is not difficult, installation costs are low, and operation costs are incidental.

Merely circulating brine through the unit heaters is, however, not enough. Brines usually have a temperature well below the freezing point of water, causing frost to form on the fin coils—enough to quickly prevent the movement of air from the fan through the refrigerated coils, and thereby end the air-conditioning effect and require defrosting.

To prevent this—and get the air-conditioning effect—simply install a water eductor (as shown in the drawing). Then sufficient warm brine (leaving the unit) is recirculated to raise the brine's temperature above freezing. And efficient cooling is the result, with no frost formation on the coils.—*Roy Emison, Kansas City, Kan., in July 1951 issue of "Power."*

Liquid-Caustic Handling Made Safe

When San Francisco Brewing Corp. switched from flake to liquid caustic soda for its bottle washing machines, the company took special safety precautions. Liquid soda is easier to handle than flake, but it requires dilution, and tanks must be cleaned. All of these operations are potentially hazardous to employees.

In areas where men work with the chemical, rubber gloves and goggles are conveniently located. Before entering the tank, special clothing must be put on to protect the body. A sign (see photo) gives precautions prior to entering for cleaning.

Attached to the tank wall is a clamp, to which can be secured the handle of the valve on the chemical inlet pipe. For maximum safety, valve handle is padlocked to the valve clamp (arrow), before workers go in the tank.

For use in case of accidental contact with the chemical, a

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

SEPTEMBER PRACTICAL IDEA voted best was "Merging Cases From Three Lines," submitted by Frank Kirby, Maintenance Department, Westgate-Sun Harbor Co., San Diego. Described was a method for discharging from three automatic high-speed case fillers so that cases entered one at a time onto a single conveyor feeding the case sealer.

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New Louisville "Job Designed" Dryer gives 50% more production... at lower cost... in less space

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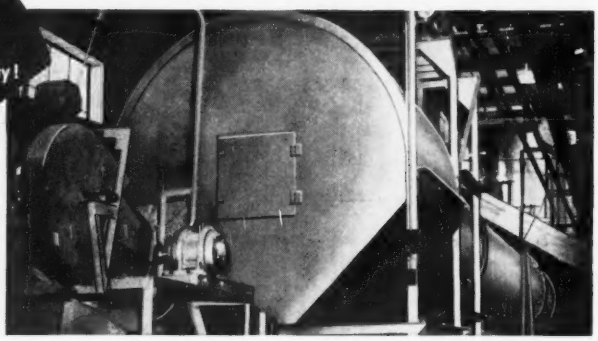

FORMER DRYER

Installed cost	$60,000
Annual production (tons)	6,000
Drying cost per ton	4.65

(space required, 2500 sq. ft.)

LOUISVILLE DRYER

Installed cost	$15,000
Annual production (tons)	9,000
Drying cost per ton	1.15

(space required, 1000 sq. ft.)

YEARLY SAVINGS of LOUISVILLE DRYER in OPERATING COSTS ALONE $21,000

Other General American Equipment:
Turbo-Mixers, Evaporators, Thickeners, Dewaterers, Towers, Tanks, Bins, Filters, Kilns, Pressure Vessels

When production costs are eating up profits, here's something worth looking into. This food processor was using a large, costly installation for drying until he asked a Louisville engineer to survey his production.

A dryer was designed specifically for his operations. Its performance was pre-determined in our own unique research laboratories and pilot plant. *The new dryer turns out better, more valuable production in less space—with great savings in annual operations.*

Without obligation ask a Louisville engineer to survey your drying methods.

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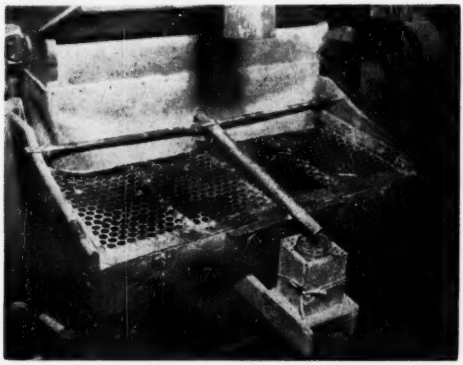
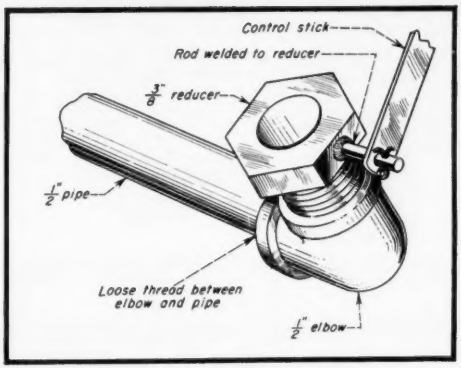
special bubble fountain has been installed. Instructions warn that if the chemical comes in contact with the eyes, washing them with plenty of water should be the immediate step—the washing to extend for at least 15 min.

After that, there should be prompt medical attention. If instructions are followed, serious accidents are unlikely. —*John H. Herzog, Chief Engineer, San Francisco Brewing Corp., San Francisco.*





Grain Car Sampling Simplified

It is no longer necessary for us to enter railroad cars to obtain an adequate sample of the malt and cereals delivered to our plant.

A representative cross-section of the car is drawn as the grain discharges from an elevating conveyor onto a vibrating screen used to remove chaff and stone. Sampling is automatic, and the size of sample can be varied at will.

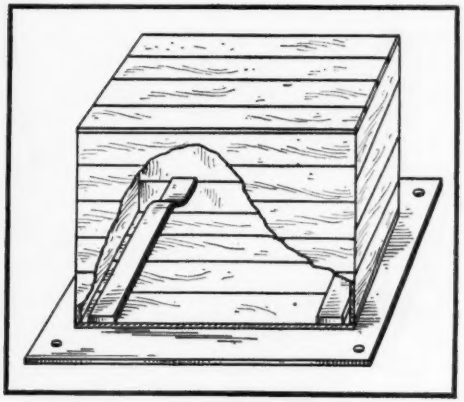
This is how the automatic sampler is constructed and used: First, a length of ½ in. pipe is attached to the vibrator, above the screen, by means of bolts passing through the pipe. End of the pipe from which sample of grain is discharged extends beyond the edge of the screen and over a box mounted on a wood platform. Sample jar is placed in this receptacle (see photo).

Other end of the pipe, through which the grain enters to make up the sample, is positioned in the stream of grain cascading onto the screen. To facilitate sample collecting as well as control the amount, a ½ in. elbow (see sketch) is loose-threaded onto this end of the pipe.

If the elbow is turned vertical—open end up—a maximum sample of grain will fall into it, to be vibrated to the outlet and go into the receptacle. And when the elbow is turned to horizontal, no sample is taken. By rotating the elbow through the 90 deg. arc between these two points, size of sample can be varied.

In our case, the opening was narrowed to ⅜ in. with a reducer, thus giving us a smaller sample more ideal for our needs.

Rotation of the elbow is controlled by a metal strap (as shown) pivoted on a rod or bolt-end which has been welded to the reducer. Metal strap can pivot between washers, cottered in place on the rod. The outer end of the strap is extended beyond the side of the vibrator, where a strap-locking mechanism (notch, clamp or wedge) holds the device in the desired location to control the size of the sample delivered.—*Herbert D. Bahrenburg, Plant Engineer, Maltex Co., Burlington, Vt.*



Jig Saves One-Third Labor

Made of a steel plate and metal straps, and costing very little, our new lug box wrecking jig is worth more than one man's labor. Device not only replaces one worker in each crew of three, but also reduces injury to parts resulting as defective sides are removed.

Repairing California-regulation fruit-lug boxes is expensive. Formerly, "breakers" hammered off a defective side of a lug, pulled remaining nails, and sent the wrecked box to the nailing machine for a new side.

When sides were rotten, or when they had been replaced recently, knocking them off by hammering weakened the remaining parts and shortened the life of the lugs. Moreover, separate pulling of as many as 14 nails per box was a tedious task.

Since using the jig, hammering off of sides is out. Instead, the box side is slipped under strong metal straps welded to a flat steel plate (see drawing). The plate, in turn, is firmly bolted to the work-bench.

Space between straps and plate is just enough to admit the box side, and sufficiently deep to allow the prongs to reach the lug-box bottom.

When a box is inserted under the straps, a "lug-breaker" easily removes the whole box side at one time by merely pushing and pulling on the top of the box. Usually all 14 nails come out clean with the side. The few that occasionally remain are straight and therefore easily hammered out by hand.

Before the jig was adopted, a crew of three "breakers" hammered off box sides at a rate just fast enough to keep a nailing machine and two nailers going.

Today, one man pulls sides and one catches any remaining nails. One nailing machine and three additional nailers are now pushed to keep up.—*W. F. Clow, River Bank, Calif.*

Chances are 500 to 1 there's a FRUEHAUF TRUCK BODY already designed to fit your special needs, too!

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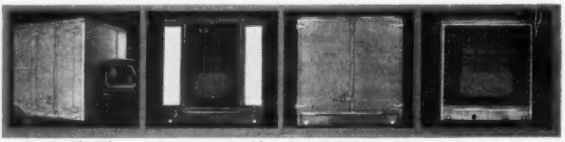
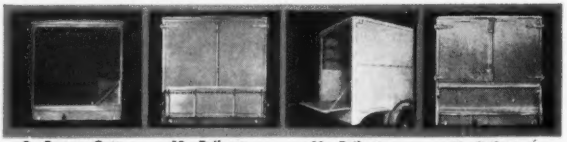
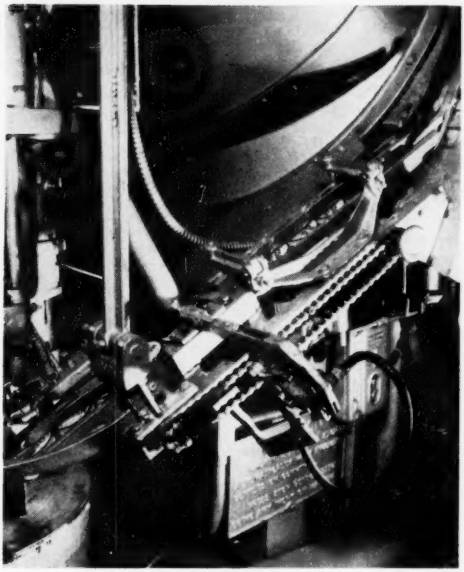
4. Single Side Door

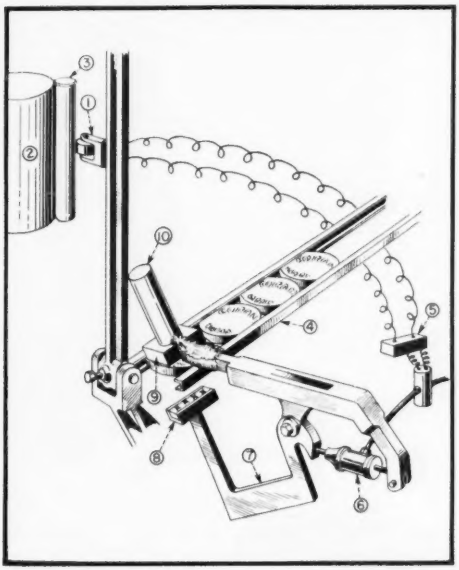


5. Double Side Door
6. Narrow Double Rear Doors
7. Full-Width Double Rear Doors
8. No Rear Door



9. Express Gate Rear
10. Tailgate (Outside Type)
11. Tailgate (Flush Type)
12. Tailgate (Doors Above)





Puts Permanent Code In Jar Caps

Through employment of an improvised mechanism attached ahead of our closing machine feed, we imprint a permanent but inconspicuous code on the metal jar caps of our glass-packed products.

As shown in our sketch, a solenoid switch (1) is attached to an upright on the screw cap closing machine (2), so that, as the machine rotates, cylindrical projections (3) operate the switch. The switch-operating cam is located so as to close the circuit while caps are at rest on the cap-feed slide (4).

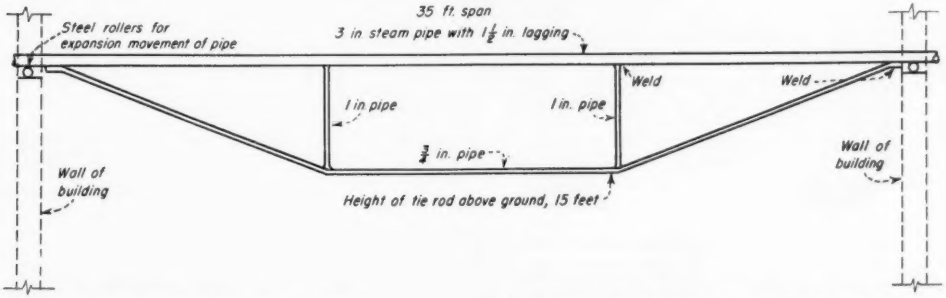
When the switch is closed, air valve (5) admits pressure against the plunger in air cylinder (6), thus giving an impulse to hinged hammer (7). Then the male code die (8), in a socket in the hammer head, delivers a blow on the under surface of the cap, conforming with the female die (9), held in a slot in the bottom of steel anvil (10). The latter is 1½ in. in dia. and 6 in. long.

The blow of the hammer imparts a raised code imprint on the surface of the cap.

Air is then vented from cylinder and hammer returns to "ready" when the current is broken. Coded cap then moves on and is replaced by another before the cycle is repeated.

Installation cost is small and operating cost negligible. Furthermore, changing of code dies is easy.

In our experience, stamping a code in the cap metal is a most reliable means of dating and identifying products packed in glass. In contrast, we have found that label coding is subject to scratching and peeling off, while indelible-ink codings may smear or be covered by store markings.—*W. A. Reed, Plant Engineer, Taylor Reed Co., Glenbrook, Conn.*



Truss to Support Your Pipe Line

During the war when steel members were unobtainable here in Australia, we were forced to use scrap materials for constructing supports for pipe lines spanning 35 ft. over a roadway between buildings. The lines were for water, steam, and ammonia (both hot gas and liquid).

Our home-made trusses have provided ample support for our pipe lines and have proved durable.

A truss can be prefabricated economically and erected in place by removing a portion of one wall for leeway sufficient to permit getting it up and fitting it. On the other hand, trusses can also be added after the pipe lines are in place. In the latter case the pipes must be temporarily aligned

Stainless must go a long way, too!

To meet the demands of national defense and civilian needs, stainless must go a long way. That's why, now, more than ever—if you use stainless—use it wisely and efficiently.

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and supported. Also a platform must be erected for the welders. In either case the truss-supported pipes should be joined inside the building walls by threaded unions or flanged couplings.

For each pipe that crossed our roadway, two pieces of 1-in. pipe were cut to carry the vertical thrust (see drawing). These pieces were welded to the pipe lines at points one-third of the distance from each building wall, and in the same vertical plane. The length of these 1-in. pipes was such that a line from their ends to the point where the pipe lines entered the walls would make an angle of 20 deg. with the pipe line.

A piece of ¾-in. pipe was bent to serve as the tie-rod. It was welded to the other ends of the 1-in. vertical thrust members and also to the pipe line within a few inches of where it entered the walls of the buildings.

If the truss is properly constructed so that the members are parallel and in the same plane, it can be brought to a vertical position by means of the unions placed just inside of the walls.

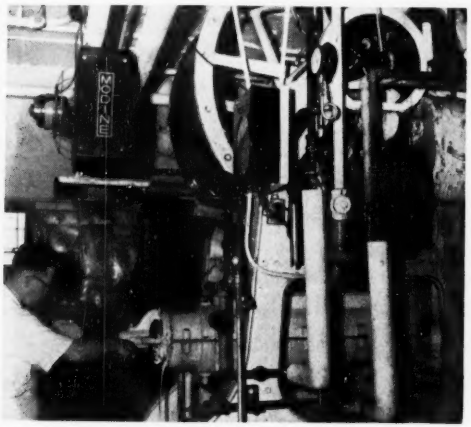
After the trusses had been welded and the pipes connected for use, each pipe was tested before being covered with insulation. A block and tackle was thrown across each line and a 500-lb. weight was then raised until supported by the pipe. This test proved the pipe-lines now had adequate support.—*F. C. Beavan, Victoria, Australia.*

Way to Avoid Sour Mops

Organic matter accumulated on mops during floor cleaning is difficult to remove. However, something can be done about the sour odor usually resulting. A very simple procedure will keep your plant free of this smell.

Install the mop rack out of doors. If no area is available on the grounds, place rack on a roof. When it rains, mops are washed. Wind carries away any disagreeable smell. And sunshine destroys the odor-producing factors and dries the mops.

It will pay in the end, if a sufficient supply of mops are kept on hand to permit every-other-day use. Chances of mop odor will be greatly decreased.—*F. E. Staff.*



Unit Heater Makes Good Syrup Cooler

Cold air blasts from a heating unit that we converted to a cooler have solved a very "sticky" fondant processing problem at our plant—and at a cost little more than that of running the electric fan.

Syrup, from which the fondant is prepared, flows onto a rotating refrigerated drum. Then when cooled, the congealed syrup is removed by a scraper across the drum's width. This syrup then enters a horizontal fondant "creamer", discharging as a ribbon of finished product.

Deposited on the drum (top center in photo) in a ¼-in. layer, the syrup was supposed to cool sufficiently to become semi-plastic and adhere to the drum's surface until removed. But it didn't.

The outside surface of the syrup remained fluid and dripped—resulting in undue messiness and preventing a uniform flow of syrup of the correct consistency into the creamer.

We licked this troublesome condition by blasting cold air against the syrup. The air used is cooled by a unit heater to which cold sweet-water is piped instead of steam. A 50-hp. Freon refrigeration system supplies this water, also serving the drum.—*D. Bradshaw, Plant Engineer, H. A. Johnson Co., Boston.*

Use Stock Sheaves—And Avoid the Pinch

Once again plants face the problem of obtaining deliveries on equipment necessary to keep pace with expanding production. Thus, ways of meeting scarce-item needs are in order. Here are tips on V-belt sheaves:

Instead of working up specifications calling for drives employing non-stock sheave diameters, apply the sheave ratio to the *stock sizes* available. This way, equally good drives can be taken from the supplier's shelf.

Stock sizes cover the great majority of all V-belt drive applications. Sizes are as follows:

V-Belt Size	Range (Pitch Dia.)	Range (No Grooves)
A—½x11/32	2.6–18″	1–6
B—21/32x7/16	4.6–38″	1–10
C—⅞x17/32	9.0–50″	3–10
D—1¼x¾	13.0–48″	5–12

If required speed can't be obtained by a combination of two stock sheaves, select the larger sheave from stock and have the smaller one made to order. Usually, result is both a cash saving and a faster delivery, since frequently the smaller sheave can be machined from stick castings or range-type castings carried in stock by the manufacturer. Time is saved because there is no call on a heavy-loaded foundry.

Practically all stock size sheaves have removable bushings with definite bore limits (minimum and maximum)—which should be considered when specifying. As an example, a 5-groove drive might be adequate for the load, but calls for bushings having maximum bores less than those required. Merely adding a groove to the required drive may be all that is necessary to obtain stock sheaves with bushings suitable for specified bores. Although stock V-belt sheaves were originally designed to accommodate flange-type straight-bore interchangeable bushings, there are now highly efficient taper type clamping-action bushings which facilitate installation and removal of sheaves. Furnished with almost all stock size sheaves at no extra cost, these bushings should be another reason for the using stock sheaves. Departure from stock specifications delays delivery. A special keyseat may require reboring, as well as a keyseater set-up, and hence additional paper work and waiting. Yet frequently a simple offset key will serve.

Also the comparatively new high capacity or super-rated belts—credited with a capacity 1.4 times that of standard belts with the same size cross section—can be used to up drive capacity. Their use can reduce the number of grooves required, thus bringing the drive within the stock-size range.—*J. H. Snartemo, Application Engineer, Allis-Chalmers Mfg. Co., Milwaukee.*

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. . . with tailor-made Riegel papers

A few things RIEGEL can do for you . . .

- Keep products dry
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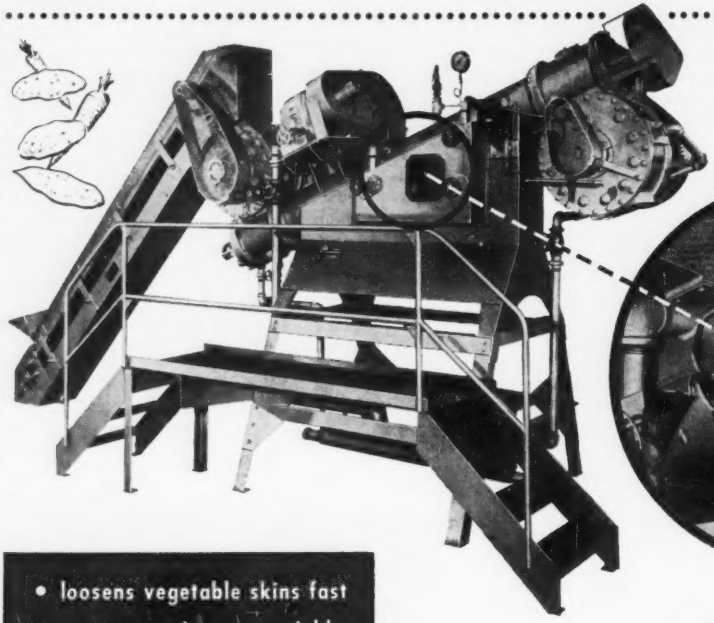
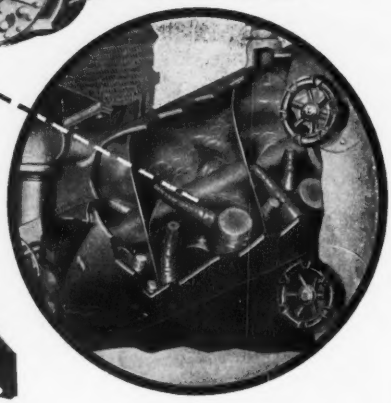
fmc Continuous High-Pressure Steamer



Cutaway view shows product being moved through inclined steam chamber under pressure. Engineered for high capacity in flow-line operations, this modern machine processes carrots, for example, at a rate of 5 to 7 tons per hour under 25–30 seconds exposure to steam pressure.



- loosens vegetable skins fast
- cuts waste, increases yield

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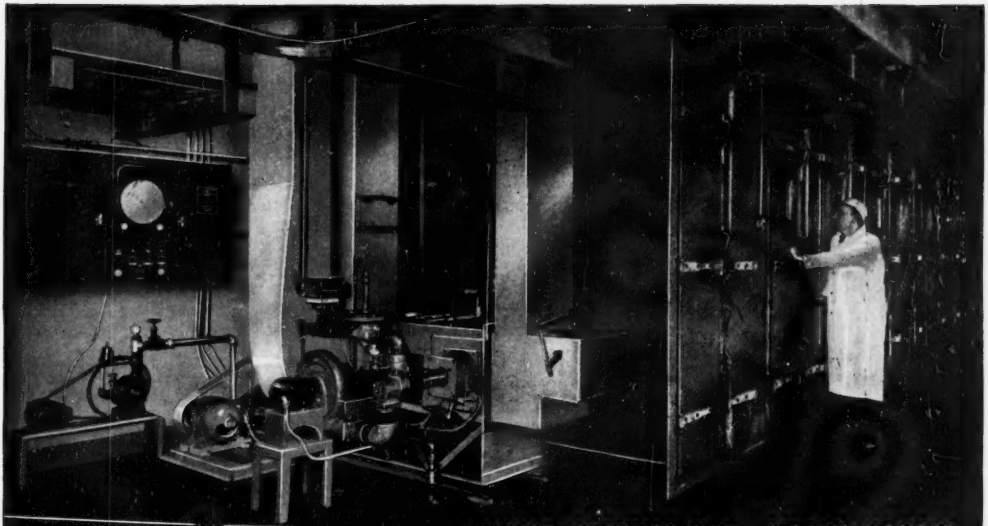

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Better Quality Products—Lower Labor Costs
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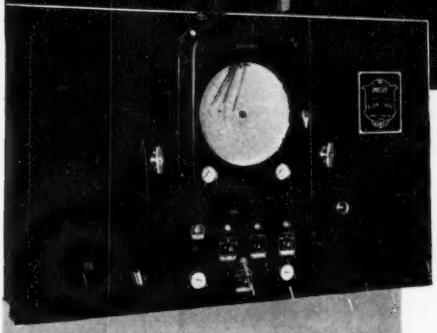

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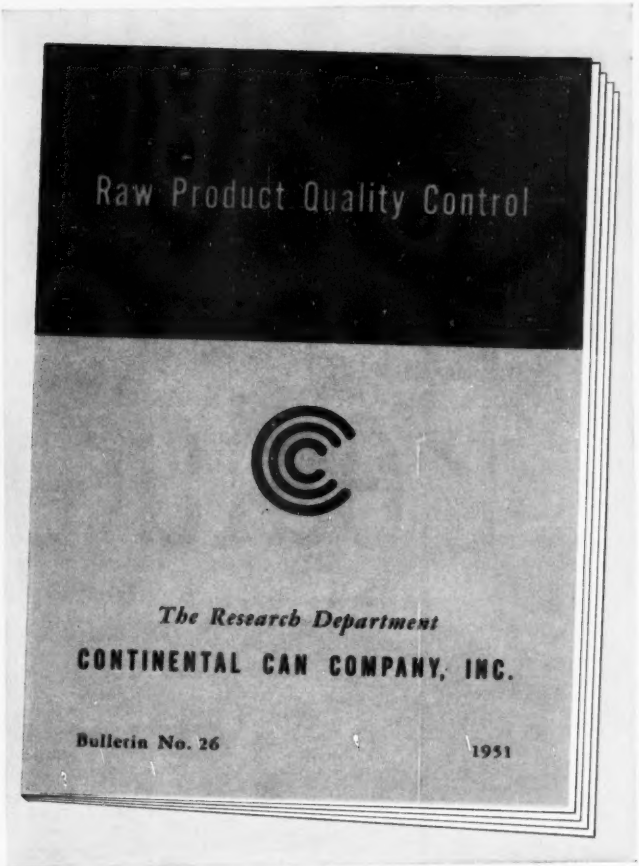

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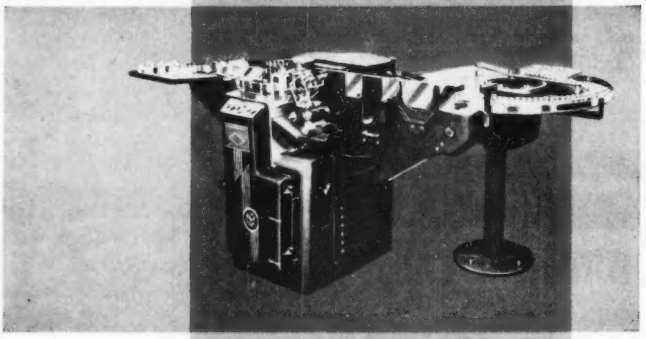

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Just add a refrigerating unit . . . special insulation . . . circulate a blanket of cold air around an inner wall . . . and there you have it — UNITEMP, a refrigerator car that maintains a more even temperature and keeps condensation and dehydration to a minimum. Heat can be provided to protect perishables from cold during winter months!

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BIGGER than conventional cars, UNICEL can carry *more* goods!

Wider doors permit UNICEL to be loaded and unloaded faster and cheaper!

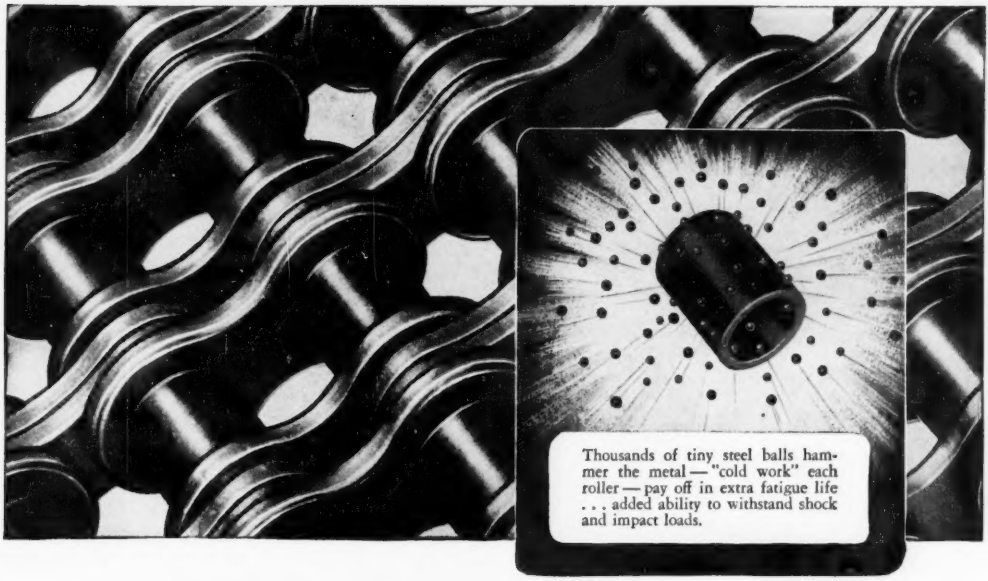
Built-in Unistrapping safely secures loads *without dunnage!*

Free from cracks, pockets or corners, UNICEL is easier to clean and keep clean!

Shippers and Receivers of meat, grain, dairy produce, fruits, vegetables, canned goods and other foods will want to know more about **Unicel** and **Unitemp.** We invite you to send for complete information today!

PRESSED STEEL CAR COMPANY, Inc.

6 N. Michigan Avenue, Chicago, Ill. • 230 Park Avenue, New York


Thousands of tiny steel balls hammer the metal — "cold work" each roller — pay off in extra fatigue life . . . added ability to withstand shock and impact loads.

Why you should be sure the roller chain you buy has

SHOT-PEENED ROLLERS

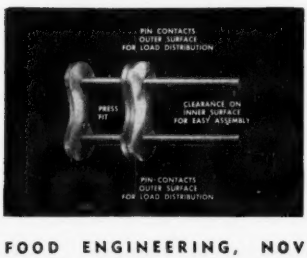
. . . one of the extra-strength features you get with every LINK-BELT Roller Chain

LOOK for the distinguishing darkened rollers on every roller chain you buy! They're your guarantee of extra fatigue life.

Shot-peening is just one of the added manufacturing refinements that make Link-Belt Precision Steel Roller Chain a longer-life chain. Controlled material selection and heat treating assure absolute uniformity . . . no weak members.

Link-Belt Roller Chain is available in single or multiple widths, in ⅜ to 3 in. single and double pitch. For the best in roller chain, get in touch with your nearest Link-Belt office.

Easier coupling and uncoupling without sacrificing load distribution


PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION
PRESS FIT
CLEARANCE ON INNER SURFACE FOR EASY ASSEMBLY
PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION

Patented E-Z Assembly feature of Link-Belt Precision Steel Roller Chain has won world-wide approval. Coupling and uncoupling of multiple width chains—right on the job—is far easier. There's absolutely no sacrifice of load distribution . . . no loss of the chain's remarkable performance. Press-fits between chain pins and middle bars have been modified. But full load-carrying capacity across the entire width of the chain has been maintained.

LINK-BELT

PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12,393

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WASHINGTON, PENNSYLVANIA PHONE: WASHINGTON 5900

JOHN C. RICHARDS
GENERAL MANAGER OF SALES

October 1, 1951

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TYPE 430 IS STAINLESS STEEL

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Our warehouse distributors are available to assist you in solving application and supply problems. Write for the name of the MicroRold distributors in your area.

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One 10 horsepower and a 25 horsepower Century motor furnish power to air condition an office.

Century 75 horsepower Type SCH motor driving a compressor in a skating rink.

Unusually Quiet Starting and Running Characteristics

For REFRIGERATION COMPRESSORS

You Need the High Starting Torque of.....

Century

Century Service Is Near Any Century Motor Driven Equipment. Prompt Service is offered by CENTURY'S National Network of more than 200 Authorized Service Stations, supervised by 28 Century Sales offices.

1. *Facilities for immediate exchange of most CENTURY standard ratings of standard construction are available at CENTURY Authorized Service Stations.*
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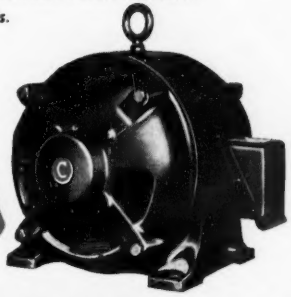
3. *Genuine CENTURY renewal parts are available at CENTURY Service Stations, CENTURY Parts Distributors and at the factory in St. Louis.*

CENTURY ELECTRIC CO. Is Celebrating Its 50th YEAR in the Electrical Industry



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Century Type SCH, Squirrel Cage polyphase alternating current High Torque motors are ideal for refrigeration compressor applications. They bring compressors up to speed smoothly and easily under full load.

Century Type SCH motors have the high starting torque characteristics required for Refrigeration Compressors. The low starting current is desirable for automatic across the line starting.

In addition, Century builds a complete line of electric motors in a wide range of types, in sizes from 1/6 to 400 horsepower. Specify Century motors for all your electric power requirements.

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CLARK Service

BY MEN WHO KNOW BEST

FROM YOUR MATERIALS HANDLING EQUIPMENT

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...coast-to-coast

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You have no time for fooling around—no stomach for "lip" service, nor "lick-and-promise" service in this day and age. Your machines must be kept rolling if you are to operate at a profit. Clark gives you "work-or-else" service—nothing less—by skilled and genuinely interested mechanics. You get what you need, when you need it.

Every service station stocks genuine Clark parts. And behind these stations is Clark factory service which fills 98% of emergency orders in less than 48 hours! We know of no other materials-handling service that can approach this record—this program.

Clark fork-lift trucks, powered hand trucks and industrial towing tractors solve your materials-handling problems. And Clark's unrivalled service keeps 'em rolling. Clark machines and Clark service are an unbeatable team that plays only for *your* profit:

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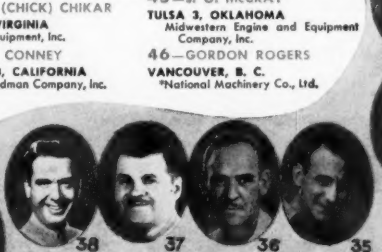

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AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 14, MICHIGAN

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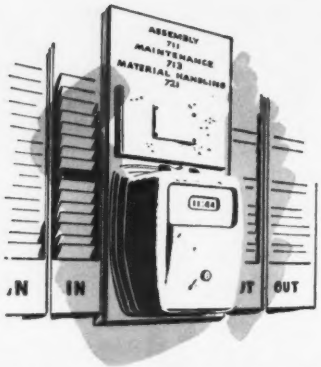
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS



A BOILER THAT PUNCHES THE TIME CLOCK

Yes — a Cleaver-Brooks Boiler "Punches In" to meet a heavy steam demand — "Punches Out" during low load periods.

Steam costs can eat deeply into profits when steam loads fluctuate — or are intermittent. With a Cleaver-Brooks boiler you are equipped for heavy or light . . . steady or variable loads, operating at full 80 per cent efficiency over the entire working range of the boiler.

You are assured of fuel economy through high heat transfer. *All* Cleaver-Brooks boilers are of the four pass design and the maximum useable heat is absorbed in these four passes before the combustion gases leave the boiler.

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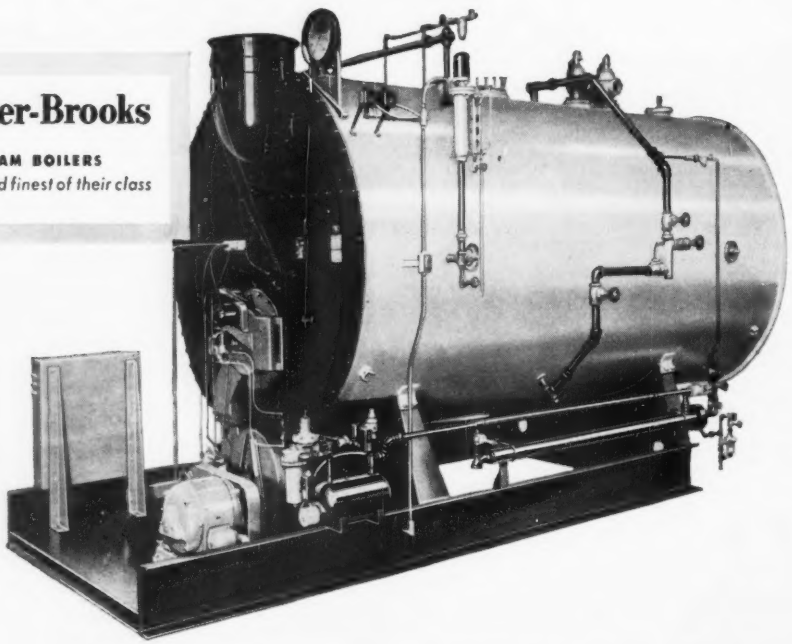
STEAM BOILERS
the first and finest of their class

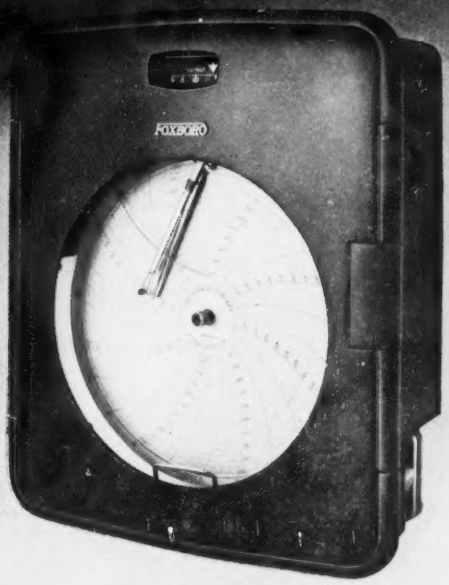
Write for the latest graphically illustrated Cleaver-Brooks Boiler Catalog. It tells and shows how you can save money with a Cleaver-Brooks Boiler installation.



better measurement and control of

PRESSURE

From vacuum to 80,000 psi . . .



Whether the critical pressure of your process is full vacuum, 80,000 psi, or any range between . . . the complete diversity and engineering quality of Foxboro Instruments provide a means to measure or control it with highest accuracy and reliability. Add to this an unequaled experience in applying instruments to solve processing problems, and you have the reason for Industry's preference for Foxboro Pressure Instrumentation.

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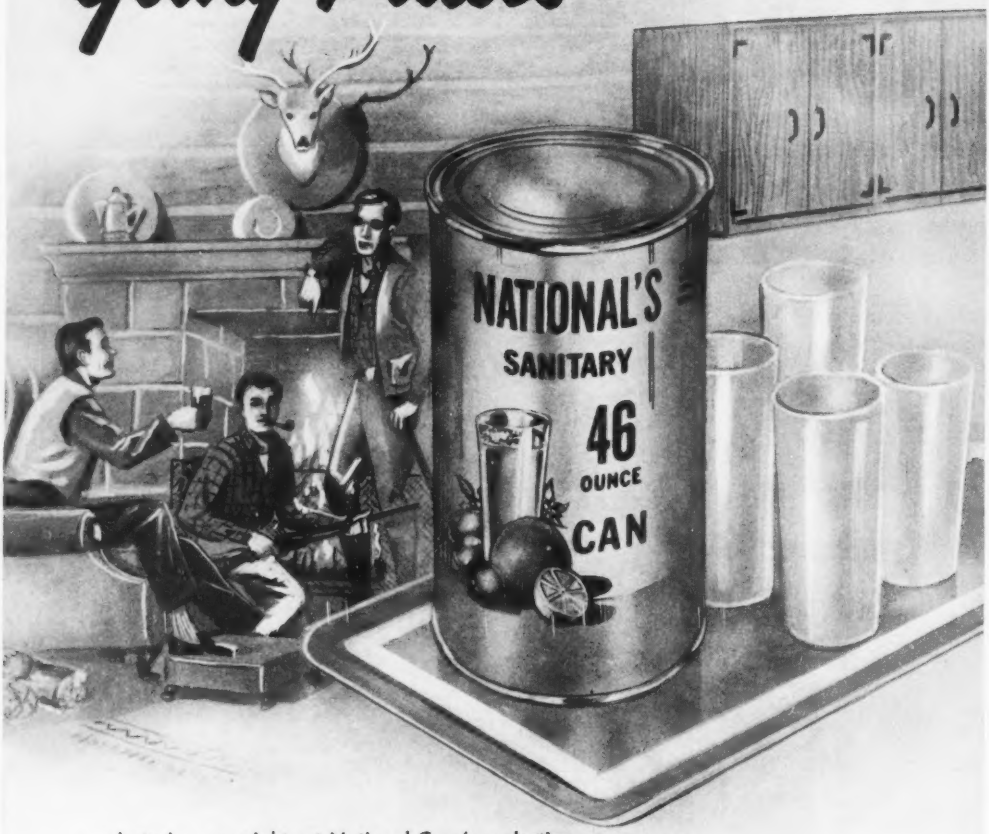
NATIONAL CANS

Going Places---



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Easily . . . Accurately . . . Economically

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Special formulations to meet the individual and varied vitamin requirements of every feed manufacturer.

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Distributor of the products formerly sold by Special Markets-Industrial Division of Winthrop-Stearns Inc., and Vanillin Division of General Drug Company

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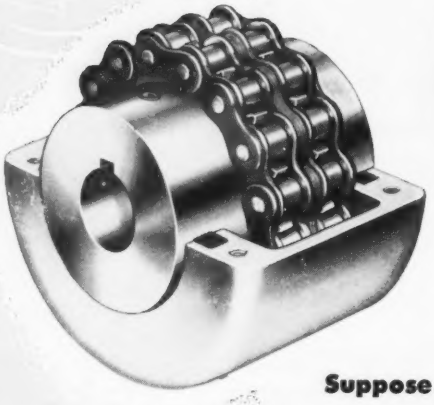
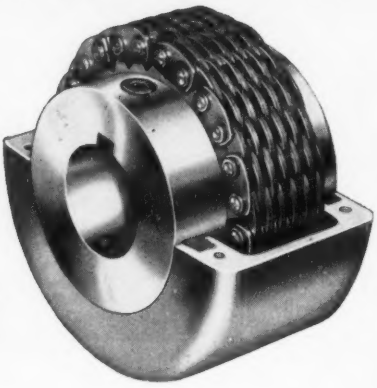
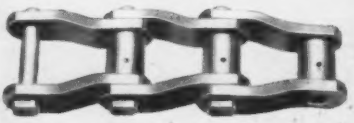




UNION ROLLER CHAIN

UNION SILENT CHAIN



UNION HEAVY DRIVE AND CONVEYING CHAINS

Suppose you need UNION Roller Chain or Silent Chain Flexible Couplings . . .

. . . for replacement or for a familiar application. Just phone or write to your nearest Union Chain Stock Carrying Distributor listed on the facing page, and he will make it his business to see that you get the earliest possible delivery.

. . . ***or suppose you need*** engineering advice on the proper use of flexible couplings for the joining of two shafts of the same or different diameters in such a way as to allow lateral movement of either shaft and compensate for a slight misalignment of the shafts. Then you should get in touch with the nearest Union Chain district representative as listed on the facing page.

You will receive competent, experienced counsel, since Union Chain manufactures all types of steel drive chains and is thoroughly accustomed to solving power transmission problems for its customers. We will welcome your inquiry.

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San Francisco 3, California

Valley Belting & Equipment Co.
2309 Los Angeles St.
Fresno, California

CONNECTICUT
Ideal Machinery Company
Plainville, Connecticut

Motor Equipment Co.
Wall & Water Sts.
Bridgeport 3, Connecticut

DELAWARE
The Briggs Rubber Products Co.
Wilmington, Delaware

Standard Industrial Supply Co.
403 Adams St.
Wilmington, Delaware

FLORIDA
Ellis & Lowe Co., Inc.
302-306 S. Morgan St.
Tampa, Florida

Farquhar Machy. Co.
720 West Bay St.
Jacksonville, Florida

General Equipment & Supply Co.
543 N. W. 5th Street
P.O. Box 1670
Miami, Florida

GEORGIA
Bearings & Drives, Inc.
515 Arch Street
Macon, Georgia

Georgia Hardware & Supply Co.
307 N. Washington St.
Albany, Georgia

Jim Horn Mill Supplies
Shellman, Georgia

Macon Supply Co.
Macon, Georgia

Phillips Hardware & Supply Co.
1022 Front Ave.
Columbus, Georgia

Richmond Supply Co.
Augusta, Georgia

John D. Robinson Co.
13 Bay Street, West
Savannah, Georgia

GEORGIA
J. M. Tull Metal & Supply Co.
285 Marietta St. N. W.
Atlanta 3, Georgia

IDAHO
Western Bearings, Inc.
320 Front St.
Boise, Idaho
Western Bearings, Inc.
156 South Third St.
Pocatello, Idaho

ILLINOIS
Hagerty Bros. Co.
923 S. Washington St.
Peoria 2, Illinois

W. M. Hales
Danville, Illinois

W. M. Hales Co.
Hillsboro, Illinois

W. M. Hales Co.
W. Frankfort, Illinois

Mid-States Industrial Corp.
2401 Eleventh St.
Rockford, Illinois

Northern Illinois Supply Co.
Carpentersville, Illinois

INDIANA
Diamond Supply Co., Inc.
616-24 N. W. Second St.
Evansville, Indiana

Sherer Electric Co.
940 S. West Street
Indianapolis 25, Indiana

The South Bend Supply Co.
South Bend, Indiana

KANSAS
Bearing Service Co.
341 N. St. Francis Ave.
Wichita 2, Kansas

W. A. Thomas Supply Co.
112-114 West Third St.
Pittsburg, Kansas

KENTUCKY
Sherman Bros. Mill Supply
222 South Shelby St.
Louisville 2, Kentucky

LOUISIANA
Behring's Bearing Service, Inc.
Lake Carles, Louisiana

Dixie Bearing & Supply Co., Inc.
733 N. 21st St.
Baton Rouge, Louisiana

Weeks Supply Co., Ltd.
Monroe, Louisiana

Woodward Wight & Co., Ltd.
New Orleans, Louisiana

MARYLAND
Hagerstown Equipment Co.
Maryland Ave. & Memorial Blvd.
Hagerstown, Maryland

M. F. Holland Co.
Lee & Sharp Sts.
Baltimore, Maryland

MASSACHUSETTS
Bellamy-Robie, Inc.
45 Main St.
Cambridge, Massachusetts

Babcock Equipment Co.
163 Highland Ave.
Needham Heights 94, Mass.

MICHIGAN
Abrasive Supply Co.
821 W. Milwaukee Ave.
Detroit, Michigan

MINNESOTA
Iron Range Equipment Co.
490 N. Snelling Ave.
St. Paul, Minnesota

Jurgens Company
519 Cleveland Ave.
St. Paul 4, Minnesota

MISSOURI
Bonne Terre Farming & Cattle Co.
Bonne Terre, Missouri

Industrial Equipment Corp.
325 E. Walnut St.
Springfield, Missouri

Te-Co, Inc.
801-805 N. Second St.
St. Louis, Missouri

Wildhagen Machine & Supply Co.
224 S. Third St.
St. Joseph 3, Missouri

MONTANA
Western Foundry Co.
802 Toole Ave.
Missoula, Montana

NEW JERSEY
Burton Supply Co.
390 Union Ave.
Paterson, New Jersey

Mill Supply & Hardware Co.
285-289 N. Willow St.
Trenton 4, New Jersey

Old Reliable Supply & Equipment Co.
11th St. & Newton Ave.
Camden, New Jersey

NEW MEXICO
Union Industrial Corporation
112 East Mermod St.
Carlsbad, New Mexico

NEW YORK
Laurence Belting Co.
111 Chambers St.
New York, New York

S. H. Pooley Belting Co.
38 W. Seneca Street
Buffalo 2, New York

Transmatic Equipment Co.
11 North Pearl St.
Albany, New York

U. & S. Inc.
Lincoln Bank Bldg.
509 S. W. Street
Syracuse, New York

Ulster Foundry Corp.
20 St. James St.
Kingston, New York

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Piedmont Mill Supply Co.
P. O. Box 130
Salisbury, N. Carolina

OHIO
Brubaker Gear & Mfg. Co.
Barberton, Ohio

Cincinnati Transmission Co.
3330 Montgomery Road
Cincinnati 7, Ohio

OHIO
C. J. Edwards Company
5005 Euclid Avenue
Cleveland 3, Ohio

Lima Armature Works, Inc.
440 N. Main St.
Lima, Ohio

Mill & Factory Supply Co.
317-10th St.
Toledo, Ohio

Wilkof Hardware & Supply Company
1100 Warner Road, S. E.
Canton, Ohio

Winkle Electric Co., Inc.
701 Andrews Avenue
Youngstown 2, Ohio

OKLAHOMA
C. J. Dagwell & Company
816 W. Main St.
Oklahoma City, Oklahoma

Ore Reclamation Company
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Pitcher, Oklahoma

OREGON
Electric Steel Foundry
Eugene, Oregon

Fisher Bros. Company
522 Bond Street
Astoria, Oregon

Industrial Machinery & Supply Co.
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La Grande, Oregon

Industrial Steel & Supply Co.
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J. W. Minder Chain & Gear Co.
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Portland 14, Oregon

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S. S. Brenner
2303 E. Philadelphia Street
York, Pennsylvania

Clark Materials Handling Equipment Co.
1407 Derry Street
Harrisburg, Pennsylvania

Industrial Supply Co.
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Hazleton, Pennsylvania

Keystone Bearing & Supply Co.
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Allentown, Pennsylvania

Maximon Machine Co.
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Altoona, Pennsylvania

Reilly Bros. & Raub
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Sherwin Bearing Co.
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Transmission Equipment Co.
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Pittsburgh 10, Pennsylvania

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Crawford & Garner, Inc.
P. O. Box 1839
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O'Brien Dobnam Company
213 E. Evans St.
Florence, S. Carolina

Southern Mill Supply Co.
Summerville, S. Carolina

Thackston-Davis Supply Co.
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Columbia, S. Carolina

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Hoyt N. Payne Co.
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Knoxville, Tennessee

Tennessee Machinery Co.
114-119 Third Ave., South
Nashville 3, Tennessee

Tipps Engineering & Supply Co., Inc.
260 N. Front St.
Memphis, Tennessee

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2614 Sylvan Ave.
Dallas, Texas

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1825 Washington Ave.
Houston 10, Texas

Bearing Specialists Co.
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Lubbock, Texas

El Paso Machine Works, Inc.
1600 E. 4th St.
El Paso, Texas

Great Western Supply Co.
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Fort Worth, Texas

Lloyd Electric Co.
511 E. Commerce St.
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Overton & Mims, Inc.
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VIRGINIA
Blue Ridge Hardware & Supply Co.
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Mill Supplies Corp.
South Norfolk, Virginia

WASHINGTON
Electric Steel Foundry
1327 Washington St.
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Park Engineering Sales Co.
2391 Dudley St.
Parkersburg, W. Virginia

Bluefield Hardware Co.
Bluefield, W. Virginia

Smith Steel Supply Co.
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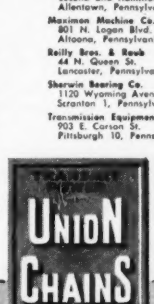
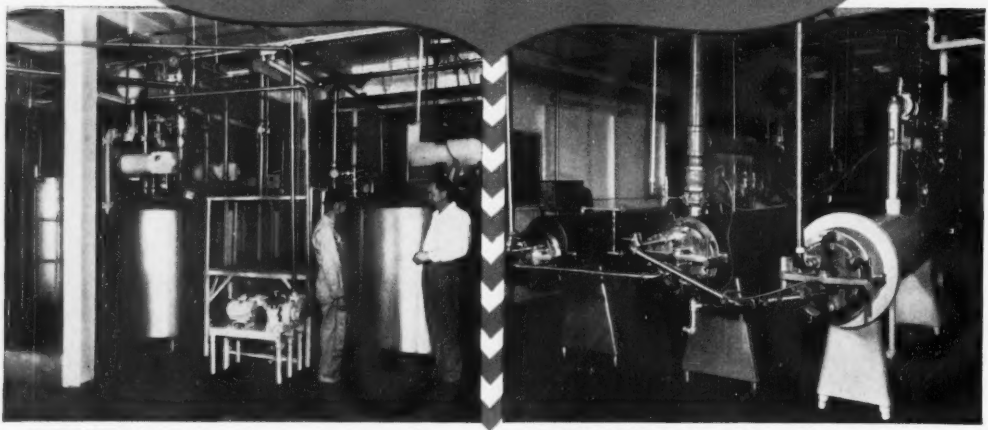
Dale Industrial Supply Co.
528 Forest St.
P. O. Box 867
Wausau, Wisconsin

Richard E. Ela Co.
744 Williamson St.
Madison, Wisconsin

The Union Chain and Manufacturing Company — **Sandusky, Ohio, U.S.A.**



—ANOTHER CONCENTRATES PLANT TELLS THE SAME STORY



J. W. CARTER *(right), Plant Manager, Concentrates Division, Florida Citrus Canners Cooperative, confers with Howard Branch, chief evaporator operator before a battery of Stainless Steel shell and tube flash pasteurizers and blending coolers.*

IN THESE STAINLESS STEEL *refrigerated blending tanks, high concentrates are cut back with freshly-extracted single-strength juice. Stainless equipment does not affect the ascorbic acid content of the juice.*

"Stainless Steel is the only thing that can do the job"

VISIT almost any of the frozen citrus concentrates plants in Florida and you'll find Stainless Steel equipment in a key role. Its high resistance to citric acid, the ease and thoroughness with which it can be cleaned and its all-around versatility make it almost irreplaceable for this kind of service.

J. W. Carter, Plant Manager of the big Florida Citrus Canners Co-operative at Lake Wales, expresses the same high opinion of Stainless heard from other plant managers:

"During the past season we processed about three million gallons of concentrates, and we all feel here that Stainless Steel is the only thing that can do the job. Its wide use all over the plant is evidence that we have been unable to find anything better."

Stainless Steel equipment in the Lake Wales plant was installed in 1947. It has been in use every season since, operating 6½ to 7 months out of the year. Operation is continuous with a clean-up break every 72 hours. In spite of this rugged schedule, there has been practically no maintenance aside from cleaning.

Whether you concentrate citrus juices or process other types of food products, you'll find Stainless Steel equipment a paying investment . . . especially if it's U·S·S Stainless. Some grades are now in restricted supply, but build your future plans around U·S·S Stainless Steel.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, FAIRFIELD, ALA. · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-1608

UNITED STATES STEEL

Stop paying freight on WATER...

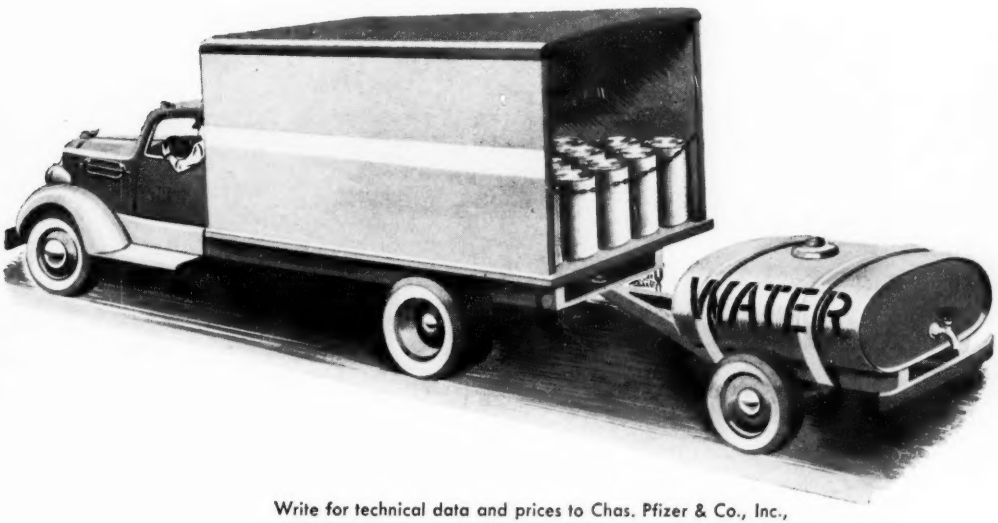
CITRIC ACID ANHYDROUS

Contains no water—Cuts your freight bill

Recently increased freight rates make Citric Acid Anhydrous a better buy than ever. It is identical to Citric Acid U.S.P. in every respect *except that it contains no water of crystallization.* With the anhydrous material, you pay the freight on the citric acid alone and *not on the water.*

You Save 8½ pounds in Shipping Weight for Every 100 pounds of the U.S.P. Material Formerly Used. You Can Save a Ton on a Truckload Shipment!

Prepared by a special Pfizer process, Citric Acid Anhydrous cannot dry out or cake under normal conditions in storage, nor does it absorb water. Its composition remains absolutely constant, insuring uniform results with less waste.



Write for technical data and prices to Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.; 425 North Michigan Ave., Chicago 11, Ill.; 605 Third St., San Francisco 7, Calif.

PFIZER QUALITY ®

PFIZER

Manufacturing Chemists for Over 100 Years

The new king of tumbler packaging

From birth to top rank in less than 2 years! *The story of the new Shallow Whitecap . . .*

Late in 1949, the White Cap Company first announced the new Vapor-Vacuum cap for tumbler packages. This cap—a new variation of the basic Vapor-Vacuum design—introduced some very important new elements of serviceability in tumbler caps.

Now, just two years later, the new *Shallow Whitecap* is solidly established as the king of tumbler caps. With unprecedented speed, the leaders in the field of tumbler packed foods have switched to the new cap. Almost overnight, there's been a major revolution in tumbler packaging.

The reason? It's quite simple. The new Shallow Whitecap is *the only tumbler cap which can take hook-opener damage—and still serve as a reclosure.* Made with a special metal and with less height, it is flexible. *Distort it as you will, it bends right back again*—and goes on serving as a dust-proof, odor-proof cover.

For all tumbler packages of preserves, jellies, pickles, peanut butter, cheese, etc., *it's the king!*

"VAPOR-VACUUM"
Seal and Re-Seal

PRODUCT OF WHITE CAP COMPANY—CHICAGO

THEY ALL USE

SHALLOW WHITE CAPS

. PETER PAN . . . NORDIC . . . ARMOUR . . . ITALIAN KITCHEN
DDIE . . . EARLY CALIFORNIA . . . BELL-VIEW . . . GOODWIN'S
. HEART'S DELIGHT . . . PUTMAN'S . . . TEMPTING . . FLOWERS
OODWIN'S . . . AIRLINE . . . TREE TOP . . . MANTILLA . . . BAMA
HONEYDEW . . . MA BROWN . . . HOME BRAND . . . HEINZ . .
. LAKE SHORE . . . FRUITLAND . . . TEA GARDEN . . . CRU-BRO .
MARY ELLEN'S . . . GOLDEN WEST . . . IDEAL BRAND . . . MOTT
IATCO . . . PETER PAN PEANUTS . . . ROSE DRIED BEEF . . .A GA
VERLAND . . . PREMIER . . . GARNER . . . BEDFORD . . . STELLA
SMUCKER'S . . . BRICE . . . . . STRATFORD FARMS . . .
TA-FOOD . . . ANN PAGE . . . TEA GARDEN . . . HOLLEY .
. . CROSSE & BLACKWELL . . . WATHENA .
RABEL . . . OLD TYME . KERR'S . . OLD VIRGINIA
HITE HOUSE . . . AVES . . . KERN'S
. KIMBELL'S . . . OATES
JBY-BEE . . . FOZZ
OLSUM . . .
ESSEY'S . . .
. FRUITCREST . . .
ELLMAN'S . . . MOTT'S
ROOK-MAID . . . DIXIE .
. GARNER'S . . . KRAFT
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. . . WE . . .
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L . CERTIFIED . . . ROSE
. E. A. WRIGHT . . . . . MONARCH
Y PACK . . . WORLD OVER . . . SUNSWEET . . #730 NEW BLEND
AMS BRAND . . . NATCO MUSTARD . . . LUCKY LEAF . . . STEFFI

PEANUT BUTTER

PICKLES

JELLIES

CHEESE

PRESERVES

For any beaded or straight shell tumbler

"VAPOR-VACUUM" SEALED TO INSURE FRESHNESS

Makers of BOSCO use B·W VORTEX COOLERS

For Highly Efficient, Completely Automatic Processing

Bosco Company, New York City, utilizes Barry-Wehmiller Vortex Coolers in the production of *Bosco*, nationally known chocolate-malt flavored syrup. Many other producers of fine foods and beverages, packed in glass or metal, also assure highly efficient operation by using Vortex machines for cooling, pasteurizing, exhausting or freezing.

The basic engineering advantages of the Vortex pay dividends to users regardless of the application to their particular product. The patented "walking beam" conveyor and atomized spray method of heat transfer provide unusual operating economies. The unique hydraulic drive eliminates many gears and cam movements; holds friction to a minimum. Power requirements are unusually low.

Operation is entirely automatic and accurate speed control at the turn of a dial assures the finest speed adjustments to proper processing time. The Vortex is designed and engineered for years of heavy-duty, trouble-free service in many types of applications.

Write for complete information, sending us your requirements, today.

BARRY-WEHMILLER *Machinery Co.*

257

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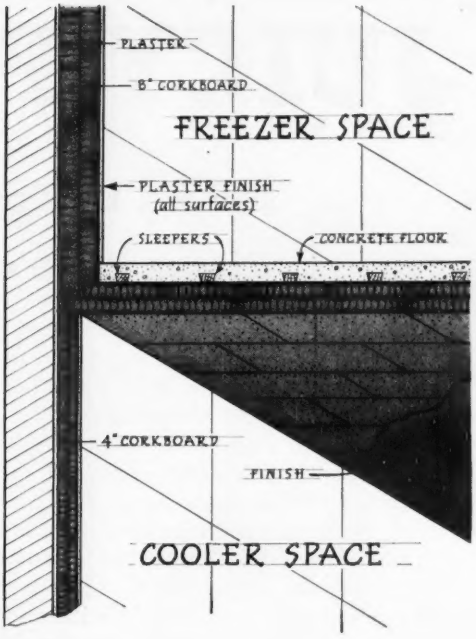
NEW YORK, CHICAGO, CLEVELAND, NEW ORLEANS, SAN FRANCISCO, MEXICO CITY, MEXICO, GUAYAQUIL, ECUADOR, RIO DE JANEIRO, BRAZIL

We have been asked:

"Why should freezer storage space be located over cooler space?"



"We plan to build a new warehouse containing both freezers and coolers," writes a wholesale food distributor. "We understand that freezer space should be built above rather than below cooler space. Is this correct? Please illustrate a good method for installing insulation in these rooms. The building will be of curtain wall construction."

To answer this question, we made the recommendation illustrated at right. Notice that the freezer is located *above* the cooler. This is sound practice whenever these areas are built one above the other. There are good reasons for this placement. If the cooler were built above the freezer, its floor might become so cold for a foot or more above the concrete floor that food placed on it for above-freezing storage would freeze and spoil. Another factor is economy. When freezers are on upper floors in multiple storage buildings, the tendency of cold air to settle makes it less expensive to refrigerate the higher temperature coolers below.

The insulation on the freezer walls is two layers of Armstrong's Corkboard, each 4" thick. Cooler insulation consists of two layers of corkboard, each 2" thick. All corkboard is applied in hot asphalt after the wall has been leveled with back plaster and primed with asphaltic paint.

The ceiling of the cooler is insulated with two layers of 3" Armstrong's Corkboard, with the first layer applied in hot asphalt and nailed to treated beveled wood strips placed on 18" centers in the forms when the floor was poured. The second layer then is applied in hot asphalt and additionally secured to it with oak skewers.

Helping you find the right answers to your various insulating problems is just one of the services of Armstrong's Contracting Organization. We can also supply you with top-quality insulating materials and the skilled workmen to apply them properly. Whenever you have an insulation job, it pays to contact Armstrong. The *complete* insulation service offered by Armstrong will save you time, money, and material.

SEND US YOUR QUESTIONS. If you have any questions on the use of insulation or the construction of low-temperature installations, we'll do our best to help you with a practical answer to your particular problem. Just outline your problem on a post card or letter and address it to Armstrong Cork Company, 2311 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATIONS

MATERIALS - INSTALLATION

FOR ALL TEMPERATURES FROM 300°F. BELOW ZERO TO 2800°F.

JUICY PROBLEM

solved by Taylor Control of citrus juice concentration!

THE PROBLEM: Uniform concentration of raw citrus juice to 60° Brix, and uniform blending of this concentrate with raw juice for 42° Brix product.

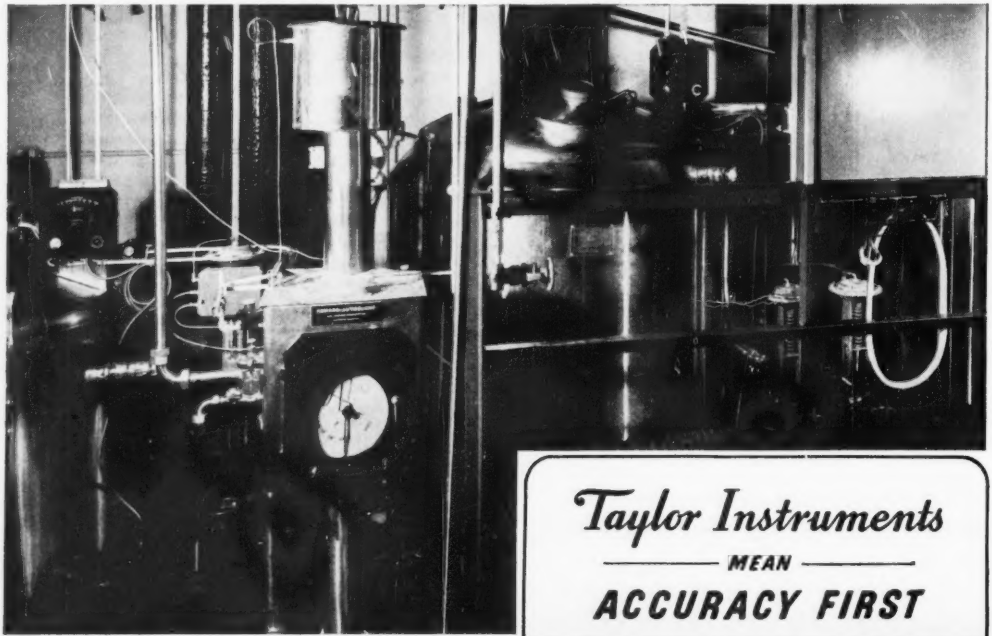
SOLUTION: Taylor evaporator control on the concentration process, Taylor temperature controls on the holding tanks for concentrate and raw juice, Taylor density control on the Carrier Autoblend mixer.

RESULT: A uniform product, held within ½° Brix tolerance, with flavor and consistency the same in every can.

You can make consumers stick with your brand, if you keep quality uniform. Taylor Automatic Process Control can help protect uniformity and cut operating costs at the same time. Ask your Taylor Field Engineer, or write for **Catalog 500.** Taylor Instrument Companies, Rochester 1, N. Y., or Toronto, Canada.

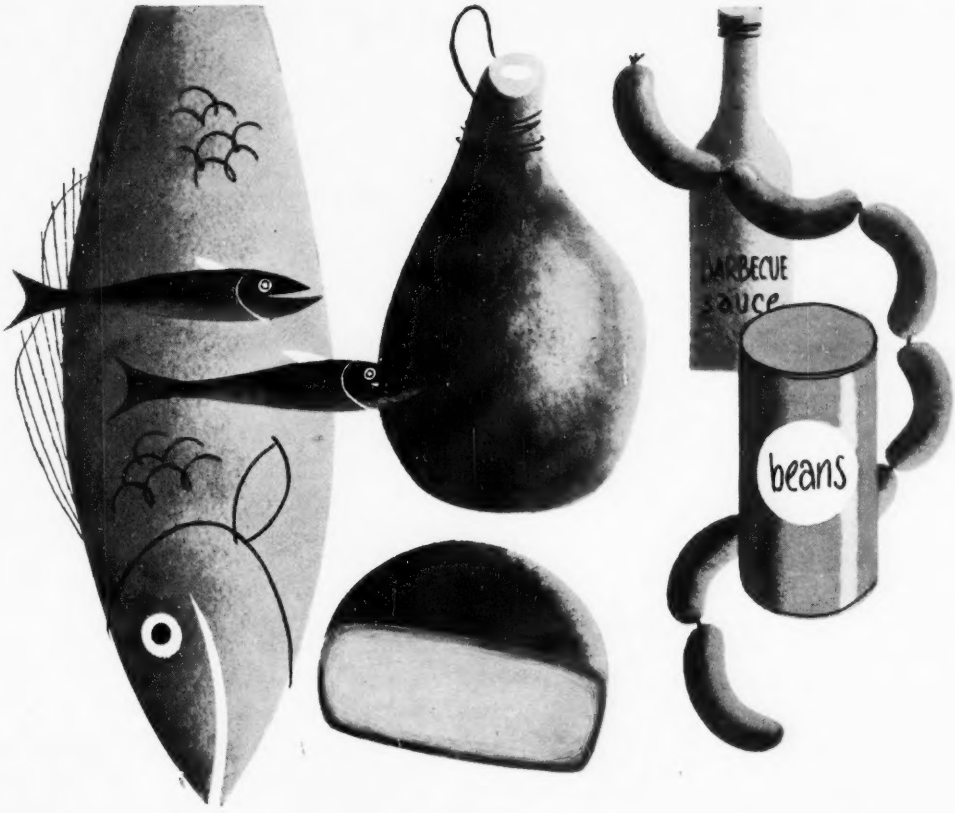
Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

Taylor's Centennial
ACCURACY FIRST
SINCE 1851



Here's a typical installation on the holding tanks and Carrier Autoblend mixer. Evaporator controls not shown.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY



SYNTHETIC HICKORY SMOKE FLAVOR

Appetizing hickory smoke flavor may now be incorporated quickly and efficiently in a wide variety of food products, including meats, fish, cheese, and sauces. Based upon original research, our newly developed synthetic hickory smoke flavor is stable to high temperatures and is capable of long shelf life under adverse storage conditions. Affecting minimum shrinkage, convenient application of this flavor is accomplished by its ready dispersion in brines and liquid products or by dry mixing with salt or other meat-curing preparations.

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STILL THE ALL-AMERICAN FIRST

Master Gearmotors have given more millions of hours of satisfactory service in the field than all other makes . . . COMBINED.

THE MASTER ELECTRIC COMPANY · DAYTON 1, OHIO

RIGHT IN YOUR OWN BACK YARD... BY WEST

JUST LET TITUS TWILLIGER, THE OFFICE PENNY PINCHER GET NEAR THOSE OLD-FASHIONED FOLDED TOWELS... AND THEN WATCH OUT FOR THE BLIZZARD.
AND THAT'S THE SKINFLINT WHO MAKES US SIGN FOR PAPER CLIPS!
AND THE WEST MAN TOLD HIM YESTERDAY HE COULD CUT PAPER TOWEL COSTS 40% WITH WESTROLL
SOME DAY I'M GONNA CLEAN UP HIM INSTEAD OF THE FLOOR!
HE'D BE WASHED UP FOR GOOD IF THE BOSS COULD ONLY SEE HIM!
HE GOES THROUGH TOWELS LIKE RABBITS THROUGH A LETTUCE PATCH!
BETTER GO WEST, OL' MAN, GO WEST!

Recognize the type? You'll find him everywhere. Wherever paper towel dispensers say, *"Help yourself, there's no limit to the use or abuse,"* of this necessary washroom service!

Paper towel costs can be reduced up to 40%. How? With WESTROLL Paper Towels and Dispensers.

WESTROLL Dispensers are designed to feed just enough toweling – *and no more!* For a thorough hand drying job. Yet, WESTROLL towel service is never miserly. A choice of 3 feed-speeds fits WESTROLL service to any type of washroom traffic.

WESTROLL Paper Towels are soft, absorbent, 'right' in wet strength. And 33⅓% more economical in regular use than interfold towels. Add to this initial saving, the extra uses found for 'easy-to-pilfer' towels; more frequent cabinet fillings; extra janitorial work. That's the real picture. As your WEST man can prove in a 10-minute demonstration.

WESTROLL Paper Towel Service is only one of many WEST products for the promotion of sanitation. Others include floor maintenance materials . . . washroom service . . . disinfectants . . . deodorants . . . insecticides . . . cleaners . . . soaps . . . protective creams. West is also the exclusive distributor of Kotex Sanitary Napkins sold through vending machines.

WEST DISINFECTING Company

42-16 West Street
Long Island City 1, N. Y.

START SAVING...

the day you install WESTROLL Towels and Dispensers!

How about a WESTROLL demonstration?

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Dept. 8

Betner...*America's Busiest Bags*

Whatever the packaging need, there's a Betner bag to fill it!

Just a few examples of Betner's complete bagging service:

DUO-TITE . . . *the Perfect "No-Sift" Bag*

At last, the ideal bag for products which must be packaged in siftproof containers . . . insecticides, fertilizers and other dry chemicals. DUO-TITE's sturdy construction combines special liners with folding, gluing, and heat-sealing. Available in sizes holding up to 25 lbs. of bulk powdered material.

THERMOSEAL . . . *the Bag with 20% More Protection*

It's a fact. There is 20% more protection offered by Betner's THERMOSEAL than by other closures. Best of all, THERMOSEAL eliminates staples and other adhesives, and insures water-vapor protection, siftproofness and retention of flavor.

BENCOSEAL . . . *the Bag or Wrap with Extreme Water-Vapor Protection*

Absolute sanitation, dryness and flavor freshness are guaranteed by this unique combination of paper, metal foil and tissue laminated with a thermoplastic wax film. BENCOSEAL may be heat-sealed at moderately high temperatures without fear of blocking, thereby rendering itself to high speed production. It lends itself to any type of printing for consumer eye-appeal.

FLAV-O-TAINER . . . *the Bag with Vacuum-Packed Freshness*

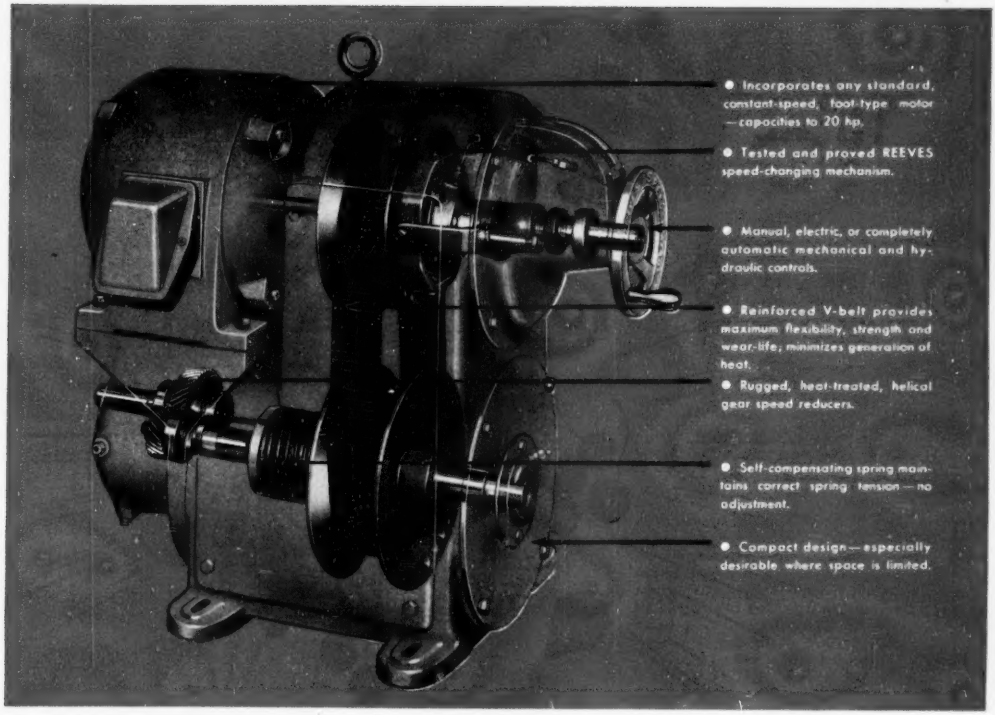
Whenever freshness is a must—Betner's FLAV-O-TAINER delivers it! Lined with Pliofilm (mfd. by Goodyear T. & R. Co.), all inner seams are hermetically sealed. And simply by replacing air with inert gas, and heat sealing at top, FLAV-O-TAINER becomes an air tight unit.

A complete bag service . . .

from idea to finished bag. Also machinery for closing coffee bags, and inserting and closing liner bags in cartons. Your inquiries are welcome. Samples with full technical information will be promptly supplied.

Benj C Betner Co DEVON, PA.

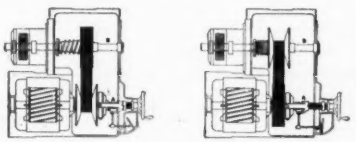
BENJ. C. BETNER CO., Richmond, Va.; BENJ. C. BETNER CO., of WISCONSIN, Appleton, Wisconsin; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California; Southern Packaging Corporation, Affiliate of BENJ. C. BETNER CO.


● Incorporates any standard, constant-speed, foot-type motor —capacities to 20 hp.
● Tested and proved REEVES speed-changing mechanism.
● Manual, electric, or completely automatic mechanical and hydraulic controls.
● Reinforced V-belt provides maximum flexibility, strength and wear-life; minimizes generation of heat.
● Rugged, heat-treated, helical gear speed reducers.
● Self-compensating spring maintains correct spring tension—no adjustment.
● Compact design—especially desirable where space is limited.

Everything's built in—

and built to give your machines trouble-free, stepless speed adjustability in the

REEVES Vari-Speed Motodrive®



REEVES Vari-Speed Motodrive utilizes proved REEVES operating principle of a V-belt driving between two pairs of cone-shaped discs which are adjustable to form an infinite number of driving and driven diameters. Discs are mounted on parallel shafts. One shaft receives power at constant speed from motor —other delivers power at infinitely adjustable speed to gear reducer from which desired speed is transmitted to driven machine.

Here's a complete variable speed power plant in one, space-saving unit . . . incorporating an operating principle proved in 300,000 installations . . . ruggedly constructed for years of trouble-free service. Without stopping the machine, a turn of the REEVES handwheel or touch of a button provides the correct speed for every operation . . . enables the machine to do *more* work and *better* work at lower cost. Available in vertical and horizontal designs; capacities to 20 hp; and speed ratios as great as 10 to 1. For the machines you are now operating and the new ones you plan to buy, obtain all the benefits of stepless speed adjustability by specifying modern REEVES Vari-Speed Motodrive. Send for free catalog No. FE67-G.

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Recognized leader in the specialized field of variable speed control

accurate • variable
REEVES *Speed Control*

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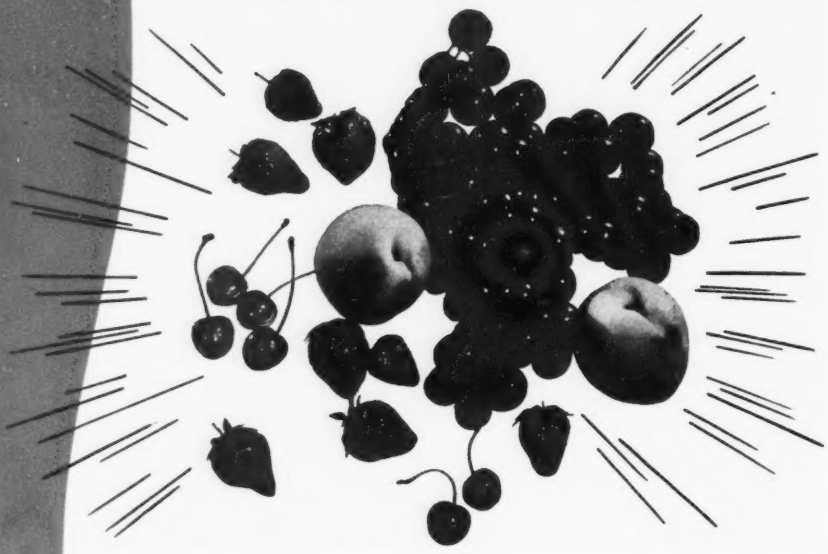

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Normally lost in distillation, these essences are initially captured and ultimately returned to the concentrate in the unusual equipment built by ALVA technicians. The result is a concentrate that is fresher, possesses more body and will go further in natural flavoring.

This remarkable technique is now standard in the production of ALVA True Fruits.

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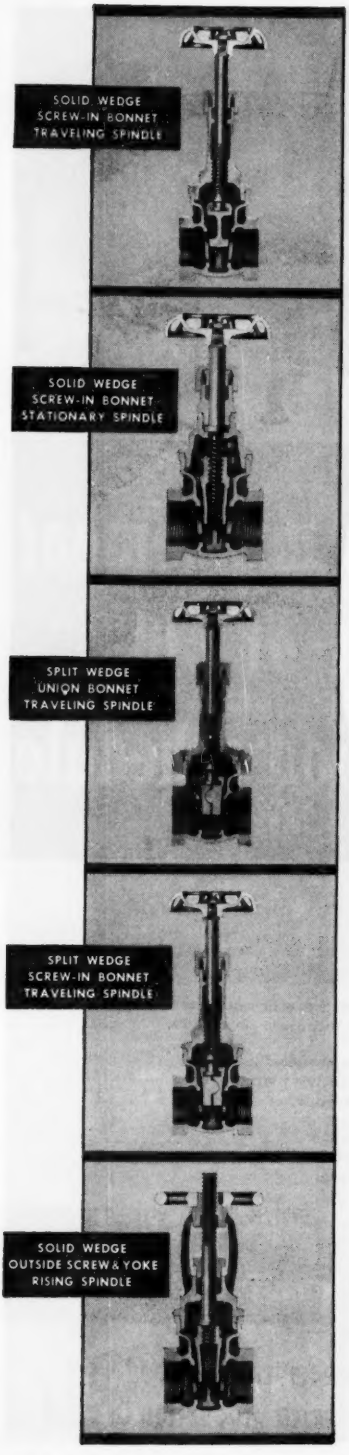
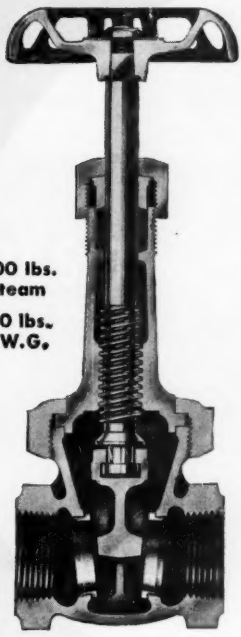
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS



Specify JENKINS for your Best Buy in Bronze Gates



200 lbs. Steam

400 lbs. O.W.G.

JENKINS FIG. 270-U

Solid Bronze Wedge

and FIG. 270-UN

Nickel Alloy Wedge

Traveling Spindle — Union Bonnet

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In Fig. 270-U, a high quality bronze wedge seats against MONEL rings expanded in the body. With this sensible design, the wear affects only the most accessible part—the bronze wedge—which can be easily replaced by slipping a new one on the stem when necessary. Records in every type of service prove it an excellent combination for lasting economy.

Fig. 270-UN, with a nickel alloy wedge, is recommended for exceptionally severe conditions of rapid wear and corrosion.

The Gates For Your Toughest Services

Made in sizes from ¼" to 2", Fig. 270-U or Fig. 270-UN will provide unequalled economy in any 200 lb. steam, 400 lb. O.W.G. service. Compare performance, especially where conditions are most destructive to valves, as in oil refineries, dye houses, chemical, rubber, and food plants. You'll find there are no other valves like them.

Whatever your need in Bronze Gates, you'll find the right valve for the service in Jenkins complete line. Thirty-five different patterns are available for steam pressures up to 300 lbs., O.W.G. pressures up to 600 lbs. All are built to Jenkins unvarying high standard which makes them the longest-lasting, lowest-upkeep valves that money can buy. Jenkins Bros., 100 Park Ave., New York 17. Jenkins Bros., Ltd., Montreal. Sold through leading Industrial Distributors.

WRITE FOR THIS FOLDER
Form 181-B It describes the Fig. 270-U and other popular Jenkins Bronze Gates or, ask your Jenkins Distributor.

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LOOK FOR THE DIAMOND MARK

SINCE 1864 TRADE JENKINS MARK

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makes mincemeat out of old production schedule

Thirty minutes per batch was the time schedule on mincemeat cookers at this eastern food plant . . . but that was **before** they replaced old-type traps with Yarway Impulse Steam Traps.

Now it's 15 minutes—one-half the time—and the plant superintendent is so enthusiastic over the production increase that he is personally spreading the news about Yarways to other plants.

A good record? Yes—but not unusual for Yarway. Yarway traps are **designed** to increase production—by sending the most practicum B.T.U.'s at top temperatures into your process or product. **They get equipment hotter, sooner . . . and keep it hot.**

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It's easy to buy Yarways . . . 216 industrial distributors stock and sell them. One is located near you.

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NEW TRAP SELECTOR—New 20-page book tells you the right steam trap for any specific application. Write for your free copy.

YARWAY

the steam trap designed with production in mind

WEST COAST PACKER *Cuts* PEELING *Costs*

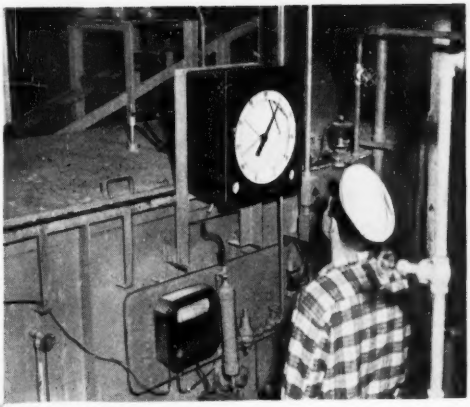

Photo courtesy Gerber Food Products, Oakland, Calif.

Photo courtesy Manteca Packing Co., Manteca, Calif.

LAST YEAR, Manteca Packing Co. of Manteca, Calif., installed a Brown Lye Peeler Control System. Now, a year later, it has already paid for itself several times over . . . and is still continuing to give results that far surpass their original expectations.

Brown Lye Peeler Control Systems are being used on peaches, apricots, plums, sweet potatoes, carrots, beets and potatoes. If you'd like to find out more about automatic controls for your caustic peeler, write for Data Sheet 3.2-6 today.

Other canners throughout the country have tried Brown automatic caustic control and all of them report:

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WEAR·EVER Aluminum Gas-Fired Kettle

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Cooks With Gas!

No Steam Needed!

Now you can add kettles without installing or extending steam facilities, if you have gas available in your plant. At the same time, this direct gas-fired kettle gives you practically all the advantages of a Wear-Ever aluminum steam jacketed kettle.

Made of aluminum, it spreads heat fast and evenly. As a consequence, you get perfect cooking; and scorching and burning are practically eliminated. A tangent draw-off and an easy-to-clean valve provide sanitary protection and make kettle emptying easy. (Kettle insert container also available without draw-off and with lift-out handles.) Has one piece hinged cover and is made of Wear-Ever's famous extra hard alloy that assures long life and low overhead.

Perfect for cooking stews, soups, gravies, cereals, jellies, fondants and other foods, and for rendering lard and tallow. Mail coupon today for complete details on this exciting new idea in food plant kettles.

SPECIFICATIONS FOR WEAR-EVER GAS-FIRED KETTLES

	No. 19010 10 gallons	No. 19020 20 gallons	No. 19030 30 gallons	No. 19040 40 gallons
Height	28½	32¼	33¾	36 1/8
Diameter of base	25⅛	29⅛	33⅛	35½
Size of draw-off	1½	1½	1½	1½
Floor to draw-off	15⅜	15⅜	15⅜	15⅜
Gas inlet I.P.S.	⅜	⅜	⅜	⅜

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WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

Standard of Quality for more than 50 years

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Please send me full details about the new Wear-Ever Aluminum Gas-Fired Kettle.

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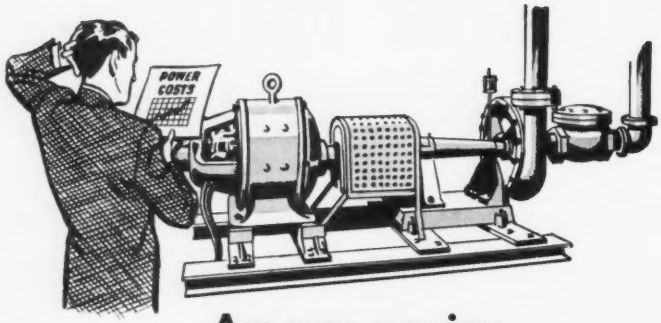
Fill in, clip to your letterhead, and mail.



Are you paying

OLD-AGE COMPENSATION

for your obsolete pumps?

Check these three factors and see how much you can save by replacing outdated pumping equipment!

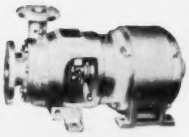
CHECK YOUR POWER COSTS and compare the efficiency and power requirements of your old pumps with those of modern I-R pumps. You may be amazed at how much you can save in power alone by replacing obsolete pumping equipment with today's more efficient I-R pumps. When one company recently replaced two old units with new I-R pumps the power bill dropped immediately from $1100 to $800 a month—*a saving of $3600 a year in power consumption alone.*

CHECK YOUR MAINTENANCE COSTS and see just how much it's costing you in both time and new parts to keep your old out-of-date pumps in operating condition. Today, lower maintenance is more important than ever before when it comes to keeping down your operating costs. And you'll find that *ease of maintenance—and less of it*—is inherent in the design and construction of I-R pumps. That's why they'll make such a big difference in your pump maintenance costs.

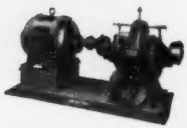
CHECK YOUR PRODUCTION CHARTS—They'll show you if your operations have lagged because of excessive "down time" brought on by pumps that can no longer keep pace with the modern high-speed processes of today. A higher availability status for your pumping equipment means higher production. You can depend on I-R pumps for continuous service because they're job engineered, *with design, construction, and materials to meet each specific application.*

Your nearest Ingersoll-Rand engineer will be glad to make a study of your present pumping equipment. He can help you determine if you have any pumps in service that can profitably be replaced by more modern, efficient I-R units.

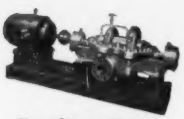
There's a COST-SAVING I-R PUMP for every liquid-handling job!



Motorpumps
Capacities to 1800 gpm
Pressures to 260 psi



Single-Stage Pumps
Capacities to 50,000 gpm
Pressures to 150 psi



Two-Stage Pumps
Capacities to 2200 gpm
Pressures to 450 psi

Multi-Stage Pumps
Capacities to 3000 gpm
Pressures to 3000 psi

Vertical Pumps
Capacities to 80,000 gpm
Pressures to 1500 psi

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532-10

CORROSION CRIPPLES— MORE WAYS THAN ONE

Valuable products as well as vital equipment are threatened

Corrosion takes its toll in more ways than one—it eats away costly, hard-to-get equipment—wastes man-hours while plants are shut down for repairs—and causes loss of vitally-needed products through contamination.

Every industry suffers from corrosion in some form, yet much of this waste can be avoided by taking these steps:

1. Check manufacturing equipment, storage tanks, and other items exposed to corrosive fumes, acids, alkalies, or moisture.
2. Arrange to protect them with AMERCOAT — the corrosion resistant coatings, each built to conquer specific industrial corrosion problems.

Manufacturers in nearly every industry have found that it pays to protect — protect with AMERCOAT.

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FOLLOW THE LINE OF *most* RESISTANCE

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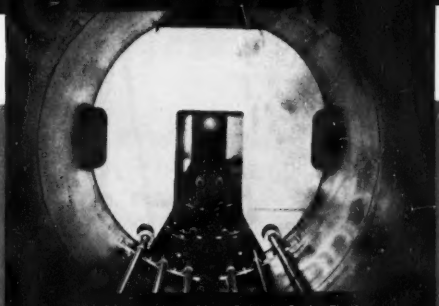
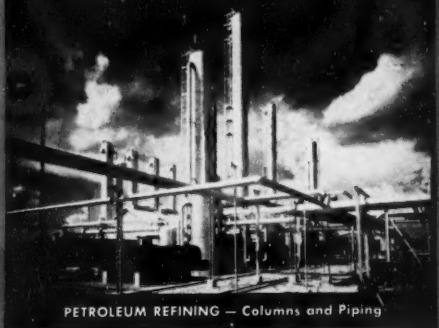
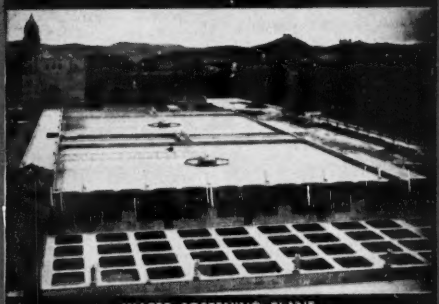


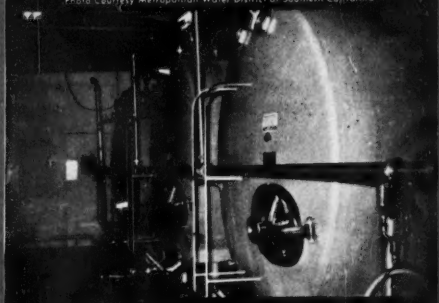
CHEMICAL PLANTS — Caustic Soda Tank



PETROLEUM REFINING — Columns and Piping



WATER SOFTENING PLANT
Photo Courtesy Metropolitan Water District of Southern California



FOOD PROCESSING — Milk Storage Tanks

TEXTILE MILLS — Dyeing and Finishing

Vitamin A adds new punch to your sales story!

IF you need some heavy leather to throw into the sales story of your food product, picture this phrase on your label: "*Enriched with Vitamin A*".

And when you turn to vitamin A, you'll naturally want to turn to DPi. For DPi's molecularly distilled vitamin A is taste-free and it's the most stable natural vitamin A concentrate available for use in pharmaceutical or food products. This is a result of DPi's worldwide sources for natural fish liver oils —and a big modern plant for continuous, large-scale refining and molecular distillation.

Yes, if you need more punch in your sales and feel that DPi Vitamin A may be the answer, be sure to call on us. We'll be glad to discuss your problem in detail. Simply write ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N.Y. • 919 N. Michigan Ave., Chicago 11, Ill. • W. M. Gillies & Co., Los Angeles and San Francisco • Charles Albert Smith Ltd., Montreal and Toronto.

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leaders in research and production of both natural and synthetic vitamin A

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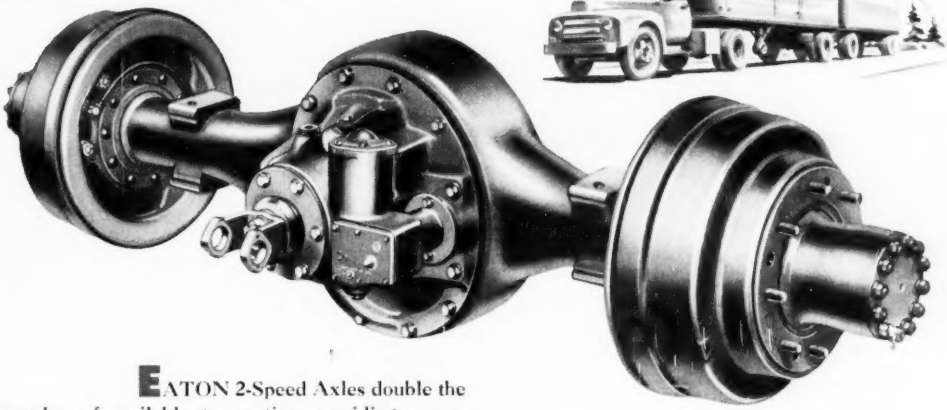
Eaton-equipped Trucks haul more, faster, longer, at lower cost!



EATON 2-Speed Axles double the number of available gear ratios, providing a combination of power and speed that makes for faster trips with full loads; more pay-load miles at lower cost per mile. Drivers select the ratio best suited to road, load, and traffic conditions—a gear ratio for maximum efficiency, economy, safety, and maneuverability. Using the right gear ratio for each situation permits engines to run in the most efficient and economical speed range. Stress and wear are reduced, not only on the axles themselves, but on engines and all power transmitting parts; adding thousands of miles to vehicle life, keeping trucks on the job and out of the repair shop. Eaton Axles more than pay for themselves—in lower maintenance and operating costs, and in higher trade-in value. For complete information, see your truck dealer.

Axle Division
EATON MANUFACTURING COMPANY
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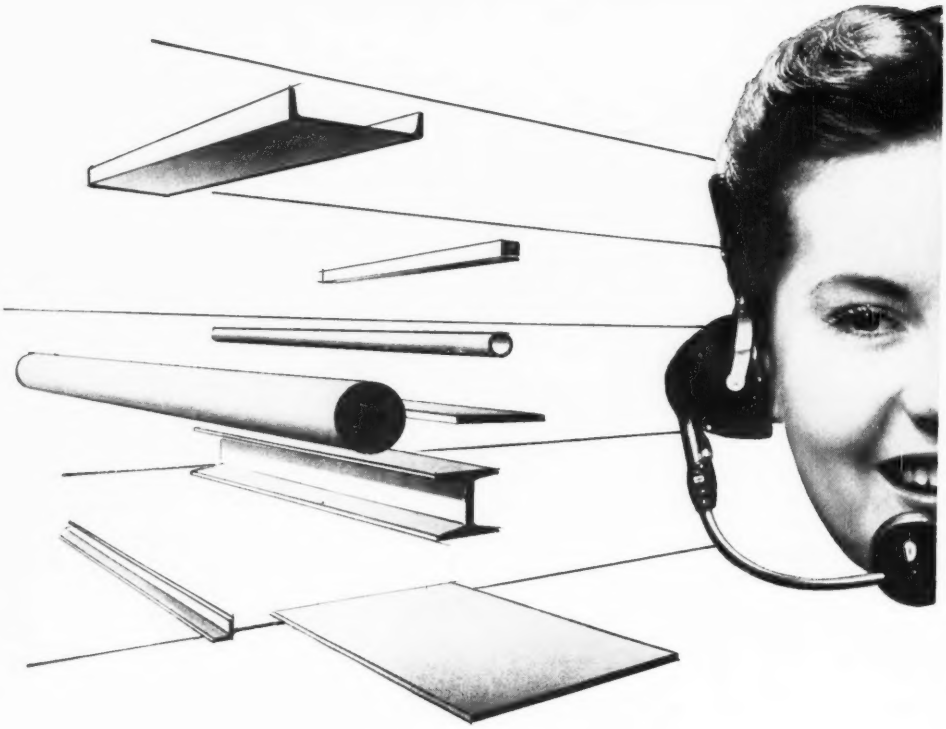

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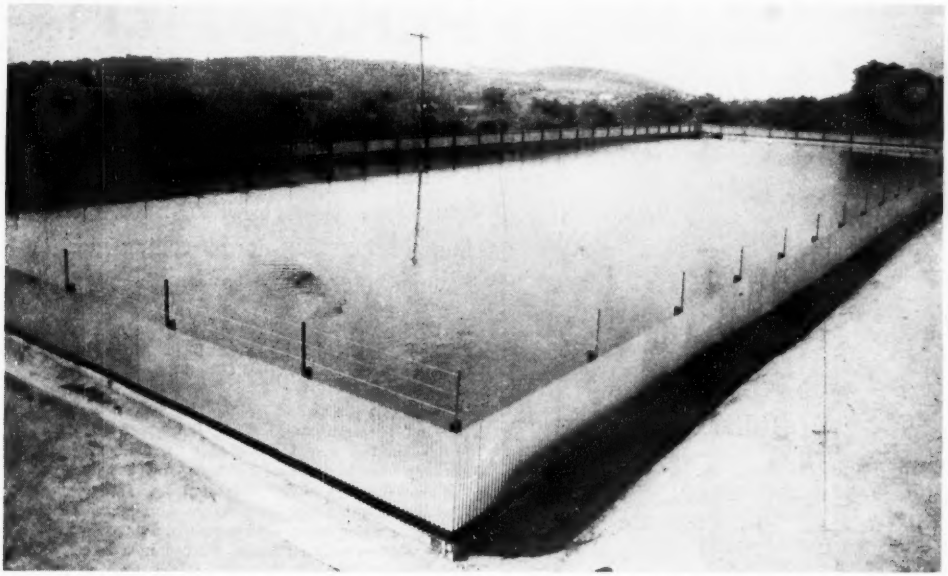


FROM HIGH setting fed by wells and springs, reservoir delivers water directly to plant by gravity.

HILL-TOP RESERVOIR Solves Processor's Water Problem

When expanded production of apple products put the pinch on Knouse's 600,000-gal. water supply, something radical had to be done. And it was—in the form of a new, ever-dependable, 3,000,000-gal. facility

TO MEET the growing demand for its top-quality apple products, Knouse Foods Cooperative, Inc., Peach Glen, Pa., had to expand its manufacturing facilities and step up its production. ■ **But in so doing, the company was faced with a major problem: There wasn't sufficient pure water to process the apples during the peak season.**

Originally, there were two 105x40x-10-ft. reservoirs. Together they held approximately 600,000 gal., an amount far short of requirements when the expanded two-shift production hit peaks calling for 780,000-gal.

Due principally to weather conditions, apples arrive at the plant on uneven schedules. So it is to the company's advantage to have a sufficient amount of water on hand at all times.

In short order, Knouse went ahead with construction of a 3,000,000-gal. reservoir (see photo) thus solving once and for all the problem of pure water for processing its Lucky Leaf apple products during the peak season.

Gravity Flow

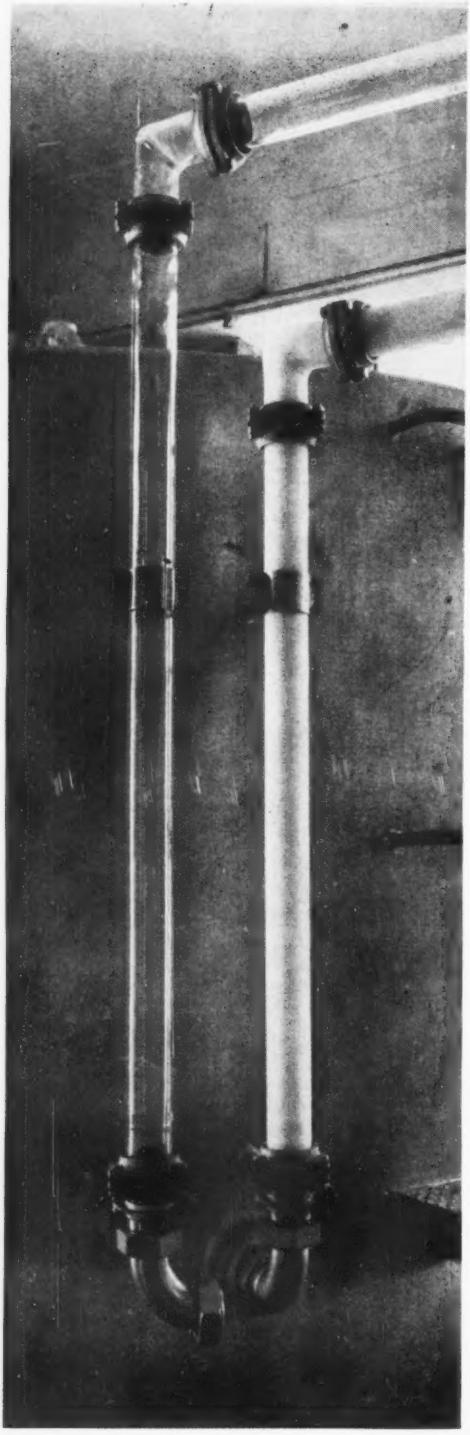
The new reservoir was dug into a hill-top, where there were already four deep wells and several mountain springs. This location had the added advantage that the water could flow down directly into the plant.

Measurement of the reservoir is 300x110x12-ft. Its walls and bottom are of 12-in. reinforced concrete. To prevent possible contamination of the water, the reservoir is protected by a corrugated aluminum and barbed wire fence. Terraces surrounding the reservoir have been seeded and landscaped.

Wells and springs have been inspected and approved by the state health officials. And company chemists and bacteriologists periodically analyze the water.

Coming from the reservoir, the water is screened during its gravity-flow into plant. Once inside, the water is pumped to a header, from which it is distributed under 85 lb. of pressure through 6-in. pipes to the various processing areas.

Water serves many purposes at Knouse's Peach Glen plant. It is used for: (1) Washing incoming fruit, (2) fluming the apples to the acid-washers and rinsers (operations that also call for water), and (3) brine-fluming apple slices to the inspection belts, and (4) for cooking, cooling, and retorting purposes.



PERMANENT

Cut Cleaning Costs

Time studies show how dairy cleanup man-hours are slashed when fixed sanitary lines go in, "take-down" tubing goes out. Savings increase with length of system

F. F. FLEISCHMAN, JR. and R. F. HOLLAND
Department of Dairy Industry, Cornell University, Ithaca, N. Y.

Savings in excess of 50 percent in productive labor required to clean and sanitize lines used to transport milk in dairies may be effected by installing permanent sanitary lines in place of the "take-down" types.

Moreover, when these permanent lines are cleaned in conjunction with a high-temperature short-time pasteurizer, an even greater labor saving results.

The above conclusions were reached in a recently completed study in which method-time measurement technics were used to gage the labor necessary for satisfactorily cleaning and sanitizing lines—both the permanent glass and the take-down steel types—in eleven different commercial milk plants.

Previous studies had demonstrated that properly constructed glass lines may be satisfactorily cleaned and sanitized without the usual dismantling and reassembling procedures[1,2,3].

Since the objective of the study was the accurate determination of the time required by a qualified person working at a normal pace to do the task, use of time study technics were employed[4].

Similar methods were used by Schiffermiller in a recent study of dairy plant cleaning operations[5].

■ **He found that from 35 to 43 percent of the total plant cleaning time was spent in the cleansing of sanitary pipes and fittings, and that of this time 60 to 80 percent was utilized in disassembling, carrying to and from the wash tank, and reassembling the pipes and fitting.**

It was realized that the best comparison between the two types of lines lay in a direct study of the time necessary to perform the cleaning and sanitizing operations, first on a take-down line and then on a permanent glass line used to replace it. However, glass piping is relatively new to dairy plants, and there were only a few making the transition while this study was being conducted. Thus, only four directly comparative time studies of this type were made.

To obtain a more complete picture, however, studies were made of the labor requirements of 11 other glass installations. This gave a total of 15 time studies of glass

FLUSHING with warm water starts cleaning of permanent milk handling line (tube at right). Then return line (left) is connected for circulation of cleaning and sanitizing solutions. Changeover (from tank to line) takes but a fraction of time previously required when the system was dismantled and reassembled daily.

PIPELINES

lines and 4 of take-down steel lines. Lines of varying length and diameter were included, as well as those handling several fluid dairy products.

The number of studies on each line varied from one to three, depending on whether the authors, after consultation with the cleanup crew, felt that more than one sample was needed. In no case was an attempt made to alter the cleaning procedures used by the plant employees.

Procedures Followed

Aims and methods of the study were carefully explained to both the plant supervisor and the employee doing the particular job. The employee was specifically requested to work at his normal pace and to follow his usual working pattern.

Observations were made of each cleaning operation, the operations themselves being broken down into elements or steps which could be conveniently timed.

For the study of the take-down piping, these elements were:

1. Disassembly time (including walking to and from wash tank)
2. Wash and rinse time
3. Reassembly time (including walking to an from wash tank)
4. Sanitizing time
5. Miscellaneous time necessary to complete operation

In studying glass lines the elements were:

1. Rinse time—to flush milk remnants from line
2. Wash time
3. Rinse time—to flush washing solution from line
4. Sanitizing time
5. Miscellaneous time necessary to complete operation

Stop watches that gave readings to 1/100 min. were used. All times were recorded in minutes and tenths of minutes, and all data were reported as the number of man-minutes required to do each operation. The "snap-back" method (hand back to zero) was used for the stop-watch timing of each element[5].

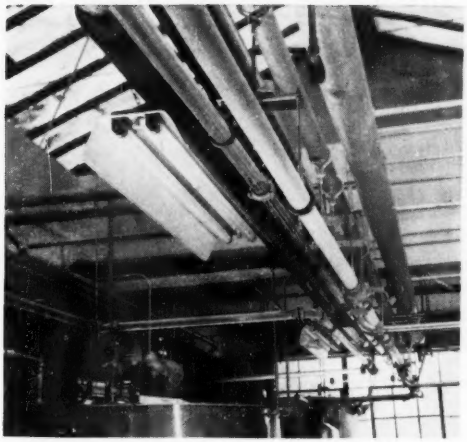
Collecting the Data

In studying the glass-cleaning operation, three sets of data were obtained. First, and most important, was productive labor-time devoted to performance of the cleaning operation.

This productive time was obtained from the five glass-line elements (steps listed above), and included all the labor-time necessary to complete the cleaning and sanitizing operation. It did not include the time spent on other jobs not directly connected with the cleaning of the line, even though the cleaning operation had not been completed. Nor did it include the time the worker was idle.

Here, attention is called to one of the important advantages of permanent lines: That during the period the cleaning solution is being pumped through the pipe, *the employee may perform other tasks.* Productive time does include, however, all time required by the worker going to and from other jobs to the pipe cleaning operation since this is necessary to the cleaning of these lines.

Second set of data was the length of time during which the pump was in operation. These were determined for each element of the cleaning procedure. Purpose was to ascertain whether the permanent lines had been properly cleaned, since cleanliness is greatly affected by the length of time the cleaning solution is circulated through the line. In all cases observed the lines were considered to be satisfactorily cleansed and sanitized.



FIXED INSTALLATION in modern dairy. Now that product- and return-lines are not disassembled, pipes are suspended near ceiling. With them out of the way, headroom is higher, space saved.

Total Time Evaluated

Third set of data was the total elapsed time necessary to carry the operation through from beginning to end. These figures show the total labor time which would be required if the workmen did nothing while the various solutions were being pumped through the line. In all plants included in the study, the cleaning of the glass line was a secondary operation, and accordingly these figures would only be significant in plants with inadequate supervision.

In studying time required to clean take-down piping, two sets of data were obtained. First there was the productive time required for the disassembling, washing, reassembling, and sanitizing. Here, as in the glass study, only the actual labor time required to complete the cleaning operation was recorded.

The second set of data covered the total elapsed time from the beginning to the end of the operation, including time spent in idleness by the employees.

Experimental Results

Results of the studies are presented in Table I and are plotted on the graph which accompanies it. They indicate that both the total productive time and the productive time per 100 ft. of pipe were, on the average, reduced by approximately 50 percent when permanent glass replaced the take-down steel lines.

It is pertinent to note that, as the length of pipe replaced was reduced, the time saved was lessened. It appears from this study, therefore, that no saving of labor-time is obtained when take-down lines of less than 45 ft. are replaced with a permanent system. As will be shown later, however, this condition does not hold when the lines can be cleaned in conjunction with a high-temperature short-time pasteurizer.

The graph shows that as the length of line increases above 100 ft, the labor saving realized by the use of the permanent system is considerably greater than 50 percent. The following tabulation gives the relative theoretical cleaning time required for pipelines of various lengths from 40 to 1,000 ft.:

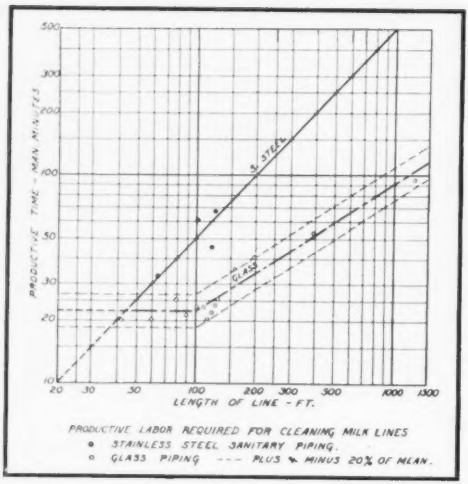

PRODUCTIVE TIME - MAN MINUTES
LENGTH OF LINE - FT.
S. STEEL
GLASS
PRODUCTIVE LABOR REQUIRED FOR CLEANING MILK LINES
STAINLESS STEEL SANITARY PIPING.
GLASS PIPING --- PLUS & MINUS 20% OF MEAN.

TABLE I—HOW FOUR MILK PLANTS Reduced Their Cleanup Time Is Shown by Comparative Studies—Before and After Change From Take-Down Steel to Permanent Glass.

Line number	7		8		11		13	
Size of line, in.	2		2		2		1½	
Length of line, ft.	125		120		102		64	80
Type of line	T-D Steel	Perm. Glass	T-D Steel	Perm. Glass	T-D Steel	Perm. Glass	T-D Steel	Perm Glass.
Frequency of observations	3	2	3	2	2	1	2	1
Productive time, min.								
Rinse		1.3		1.8		2.0		2.0
Disassemble	23.0		11.8		15.4		10.3	
Wash		7.5		11.0		4.0		4.5
Wash, rinse	8.1		13.7		15.3		6.1	
Rinse		4.3		3.0		5.5		5.8
Reassemble	34.0		17.0		28.1		14.6	
Sanitize	2.4	4.3	3.1	3.6	1.6	5.8	1.7	4.0
Miscellaneous	0	6.5	0	2.5	0	6.0	0	8.8
Total productive time, min.	67.5	23.9	45.6	21.9	60.4	23.3	32.7	25.1
Productive time per 100 ft. of pipe, min.	54.0	19.1	38.0	18.3	59.2	22.8	51.1	31.4
Total elapsed time, min.	101.6	63.5	74.3	52.5	86.0	58.0	80.2	72.0

TABLE II—LINE LENGTH VS. PRODUCTIVE CLEANING TIME. Effects of Length Are Indicated by Time Studies of 15 Permanent Glass Lines.

Line number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Frequency of observations	2	2	2	1	2	1	2	2	2	1	1	2	1	2	1
Size of line, in	3 & 4	2	3	3	3	2	2	2	1½	3	1½	1½	1½	1½	1½
Length of line, ft	1,277	394	214	196	158	130	125	120	115	110	102	90	80	60	42
Productive time, min.															
Rinse	27.6	5.0	3.8	6.3	11.6	1.0	1.3	1.8	5.0	5.0	2.0	3.8	2.0	1.0	0.0
Wash	14.1	8.8	28.0	13.9	12.2	6.4	7.5	11.0	6.5	5.1	4.0	8.8	4.5	2.4	6.8
Rinse	4.8	5.1	3.5	9.6	8.3	3.5	4.3	3.0	2.5	3.4	5.5	1.8	5.8	4.4	8.3
Sanitize	7.8	2.5	11.8	6.7	2.0	3.3	4.3	3.6	6.5	5.8	5.8	3.7	4.0	5.0	3.5
Miscellaneous	40.6	31.6	0.9	4.2	1.6	11.0	6.5	2.5	0.0	4.0	6.0	3.2	8.8	7.9	2.0
Total productive time, min	94.9	53.0	48.0	40.7	35.7	25.2	23.9	21.9	20.5	23.3	23.3	21.3	25.1	20.7	20.6
Time pump ran, min.													1		
Rinse	33.6	3.0*	3.5*	6.0	12.2	1.2	1.8	6.0	1.0	1.1	2.0	3.3	1.7	0.3	0.0
Wash	91.0	62.7	17.5	68.7	17.3	44.0	15.5	10.1	10.7	27.5	12.5	28.5	16.2	14.3	40.0
Rinse	15.5	7.4	3.8*	62.7	5.5	10.5	2.4	4.9	1.0	1.5	0.8	4.6	0.5	0.5	7.5
Sanitize	6.1	10.0*	7.4	46.8	10.7	7.0	7.2	2.6	7.0	23.0	7.0	5.9	19.8	5.2	10.0
Total time pump ran, min	146.2	70.1	24.9	184.2	45.7	62.7	26.9	23.6	19.7	51.3	23.3	43.3	38.2	20.3	57.5
Total elapsed time, min	172.0	107.5	105.3	189.7	84.5	85.0	63.5	52.5	43.5	65.0	58.0	59.5	72.0	41.0	84.0
Productive time per 100 ft. of pipe, min	7.4	13.5	22.4	20.8	22.6	19.4	19.1	18.3	17.8	21.2	22.8	23.7	31.4	34.5	49.0

* Solutions passed through lines by gravity feed.

Line Length In Feet	Relative Time Steel vs. Glass
40	1/1
100	2/1
200	3/1
500	4/1
1,000	5/1

These figures, obtained by interpolation from the Table I graph, are valid only when the line is connected into *one* complete circuit for cleaning.

Table II presents the results of time studies of cleaning and sanitizing the 15 glass lines covered in the course of this investigation. It is seen here that the average productive time per 100 ft. of pipe was approximately 22.9 man-minutes. *Although the total productive time increased as the length of the line increased, the productive time per 100 ft. of pipe remained about constant for lines of from 90 to 214 ft. in length.*

Data on Lines 13, 14, and 15 indicate that, as the length of a line falls below 80 ft., the productive times does not decline appreciably. But the productive time per 100 ft. of line increases quite rapidly. Data on Lines 1 and 2 indicate that long glass lines (1,277 and 394 ft., respectively) require considerably less labor time for cleaning per 100 ft. than do the lines of 90 to 214 ft.

Reason for the apparently longer cleaning time per 100 ft. for short lines is found in the fact that, regardless of length, there is a constant labor requirement of approximately 20 min. for preparing solutions and rinsing lines.

Lengthy lines require a longer total productive time for cleaning because more time is necessary for assembly and disassembly of the cleaning circuit. Also, more time is required for pumping the solutions through the lines and rinsing them from the lines. However, cleaning time *per 100 ft. of pipe* is still reduced considerably.

Lines 6 and 15 were cleaned in conjunction with a high-temperature short-time pasteurizer, and the productive time recorded was the time required to clean *both the pasteurizer and the line itself*. Labor savings obtained in cleaning the two pieces of equipment together were, in the case of Line 6, approximately 11 min., and in the case of Line 15 approximately 18 min.—as compared with time required to clean each piece separately.

The only extra time needed for cleaning the pipe lines in this case was that necessary to connect them into the circuit and disconnect them after cleaning and sanitizing.

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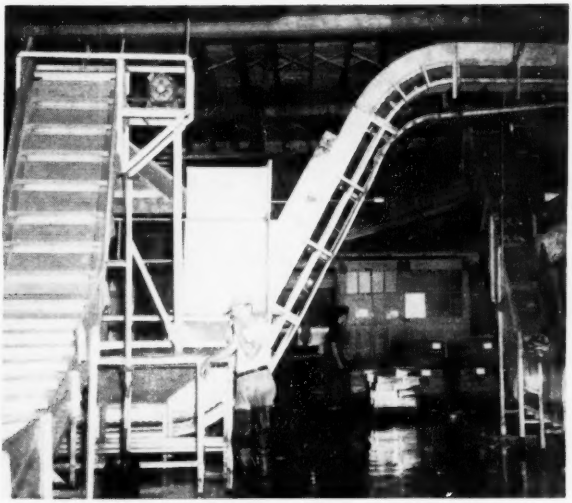
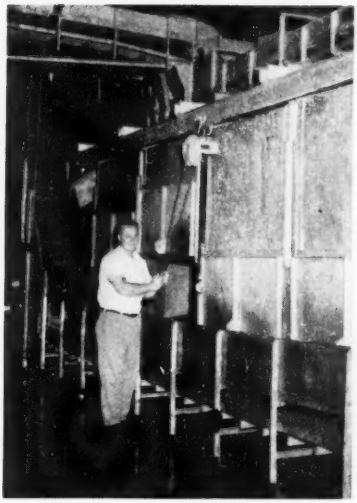




HOW SYSTEM WORKS. Left photo: Fish coming from de-icer go up flight-conveyor (left) to weighing and re-icing station (rear), then are elevated (center) to horizontal belt feeding to storage. Right photo: Closeup of new metal storage bins shows their sliding gates. Operator is seen opening one of gates, using chain hoist riding on overhead monorail. Fish will tumble out onto horizontal conveyor, then be elevated (rear) to flume going to rotary scaler.

MECHANIZED HANDLING *Does It Again*

Engineered receiving-holding system boosts seafood packer's performance—in man-hours, production, quality, storing, and cleaning. Conveyors move fish from trawlers, via weighing and icing, to metal bins, thence to processing

"WE'VE GOT TO mechanize our method of receiving and storing fish—for the traditional way is much too inefficient to keep pace."

That was management's grapple-the-problem attitude at Mariner's Fish Co., Gloucester, Mass.

Briefly, hand-labor transfer of the fish from the trawlers and wooden-box storing had come down the years as the accepted way. Bluntly deciding to quit accepting it, Mariner's then faced this twin question: *How could the incoming fish be moved easily, quickly, and directly to the processing department? And how could any left-over fish be properly stored for the next day's processing without re-handling?*

Faults of the old routine were all too evident. The company had found itself stymied by the excessive time and labor required to move the fish to processing. Also, the many wooden boxes, each holding 650 lb. of fish, cluttered up the receiving area. And these boxes entailed laborious cleaning.

In addition, the box-storing of fish was inconvenient and the facilities inadequate. Left-over fish had to be stored on the floor of the receiving department. And this was restrictive on three counts: (1) Only 30,000 lb. could be floor-stored; (2) icing down of the fish was a difficult task, not often done properly; and (3) re-handling the fish next day was not only a costly step but also resulted in the bruising of many fish.

Having concluded there was a crying need for materials-handling improvement, the company weighed the

(*Turn to page* 154)

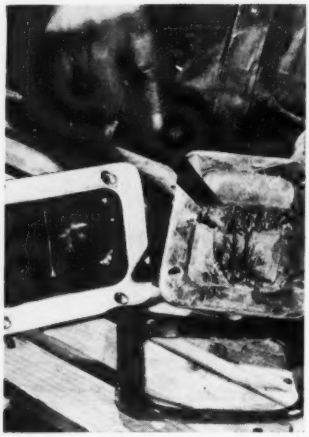
Chalk Up 5 Big Benefits

- **LABOR DOWN—Number of workers needed to move the fish reduced by over 60 per cent.**
- **OUTPUT HIGHER—Operations sped so that fish are handled twice as fast.**
- **SANITATION IMPROVED—Clean-up chores simplified because now only conveyors need be hosed down, instead of a multitude of wooden boxes.**
- **QUALITY BETTERED—Through better icing, keeping quality of fish has been prolonged.**
- **STORAGE EXPANDED—More fish can now be accommodated, with capacity raised an extra 66,000 lb.**

Prescribed is strict cleaning . . .

DETERGENT-SANITIZER is mixed with hot water in the raw concentrate reservoir, then follows path of product through the entire system.

SPATTER OR SPILL-OVER is removed from exterior of stainless steel equipment, such as this can filler, by brushing or wiping with damp cloth.



MAGNETIC TRAP "saves thousands of dollars." It picks up tramp metal injurious to costly pumps—and also customers. Seen is a week's "take."

How to Make *Stainless* Go Further

Eastern food processor combines sanitation and maintenance procedures to keep equipment on the job through the period of shortages

ELWOOD F. HANSEN
Production Manager, Nedick's Inc., New York City

Truly spectacular performance is today being obtained from stainless steel equipment by those processors who have cracked down hard and got strict observance of recognized maintenance and sanitation measures.

For, while stainless can be virtually everlasting, equipment made from it can also be ruined and its usefulness destroyed by maltreatment.

■ **With proper maintenance, you can materially aid in the fight to conserve available stainless steel. Furthermore, your stainless equipment will yield dividends in the form of extra years of trouble-free service, also in the production of a finer product at a lower cost.**

Our experience at Nedick's Inc., New York City, is typical of results that may be obtained by such careful maintenance.

We produce, can, and retail one of the country's most popular orange drinks through our 90 counter stores and a large number of independent grocers. Our raw juice concentrates are packed in California under rigid specifications and shipped to New York in 1-gal. cans.

At our plant in upper Manhattan, the cans are mechanically opened and emptied into a 100-gal. stainless steel reservoir. From here, the concentrate is pumped through a stainless magnetic trap and 2-in. line to either of two 2,000-gal. stainless batching tanks. Liquid sugar, water and other formula ingredients are added, then mixed by a stainless agitator.

Next, the finished drink or concentrate is pumped on, through a second stainless line, to be preheated, pasteurized and deaerated under close control of temperature, vacuum and time factors. It is then filled into 6-oz., 46-oz. or 1-gal. cans, which are then conveyed through drip-type cooling racks to machines that pack and seal them in cartons. By varying the processing cycle, this system will produce either (1) a concentrated orange drink, (2) fully reconstituted finished drink for sale through grocery outlets, or (3) a finished drink concentrate for use by our stores.

While temperature and pressure conditions are never severe—192 deg. F. and 24 in. vacuum are the extreme values—accurate control is necessary to insure a sanitary product and to preserve taste and color. Fully automatic control is obtained by means of a Taylor Instrument process control panel, which also supplies a permanent record of production temperatures and times.

System Carefully Designed

As noted, stainless steel is the basic metal employed in the processing equipment. In fact, we have used more than $100,000 worth of it. Most of this metal is Type 302 or Type 316, but some (pump impeller blades for example) is of special analysis. In general, stainless was specified for one or more of the following five reasons:

1. To protect the product against bacterial action and off-colors or off-flavors caused by metallic pickup.

2. To protect the equipment against attack by fruit acids inherent to the product.

3. For ease of sanitation in vessels and piping and on open parts exposed to splash, vapors or spill-over.

4. To insure smooth functioning and long life in working parts subjected to abrasion and exposure to the product.

. . . and regular conditioning

STAINLESS STEEL links and guides get weekly checkup and lubrication. Here, maintenance foreman polishes transfer plate during can change-over.

FOR LONGER service, stainless nuts and bolts were put on this can twister. Note contrast of old fastening (foreground) about to be replaced.

PUMPS AND VALVES are taken apart weekly, cleaned, inspected for wear or corrosion, and reassembled. Lines and fittings are sanitized.

5. To present a clean face to the public by maintaining an immaculate-looking plant.

Takes More Than That

But it was not enough merely to specify stainless. Good design was also required to help us realize to the fullest extent on our investment. Accordingly, in selecting and installing equipment, every effort was made to think out in advance and plan for minimum maintenance and simplified, easy sanitation.

For example, all pipe bends have been designed with large radii. Each pipe length is joined to the next with a standard fitting which can be rapidly removed for cleaning. All fittings such as ferrules, nuts, valves, and sweep ells, are recessless and beveled. This prevents incrustation where contamination could occur. It also makes for easy cleaning. Reductions in cross-section are accomplished by short tapered lengths.

One particularly valuable feature designed into the system is the Cesco magnetic trap between the collecting reservoir and the first pump.

This trap has literally saved thousands of dollars by preventing tramp metal, due to can-opening, from entering the system.

Each week there is removed from this unit a good-sized handful of metal—which could create havoc in close tolerance pumps—or in customers' stomachs—and which could seriously affect the color and taste of the product.

Similar care was exercised in designing and installing the tanks. Wherever possible, seams and sharp interior corners were eliminated. Where formed-radius construction was impractical, corners were fillet-welded and seams filled and polished. Large dairy-type manholes were provided to permit easy access. Agitator shafts were brought into the tanks through stainless steel seals. To prevent unbalanced stresses on walls and heads caused by unequal settling of floors, tank legs are supported on spreading-plates that evenly distribute the weight over a large area.

Since our building is not new, and was designed for another use, all of our large tanks had to be fabricated in sections and field-welded in the plant.* Again, to prevent unequal stresses, and also to assist in erection, tank sections were held to very close dimensional and curvature tolerances. Although conditions in this plant are probably not severe enough to induce stress-corrosion, we are happy that the fabricator employed the best shop practices as a guarantee against possible future difficulties.

To minimize carbide precipitation and future corrosion troubles near the welds, the fabricator used coated rods. He welded in short spurts (roughly, 45 sec. each), with cold water swabs following immediately while changing rods.

Adjacent surfaces were protected from weld spatter by a coating of glued-on paper. Before removing this protective coating, beads were ground flush. Then the coating was removed and the work polished. Final step was to clean the surface with nitric acid (30 percent by volume, applied for 45 min. at approximately 160 deg. F.) and to wash with hot water.

As a result of this treatment we have experienced no trouble with the welds. Accordingly, whenever our maintenance team has occasion to make an alteration or addition to the system, we use the same welding and passivating technics.

Another maintenance tip, picked up from the fabricator, was a short application of 30-percent nitric acid followed by a hot water rinse to remove rust spots caused by slight scratches from carbon steel tools or from accidental contact with other foreign metal objects.

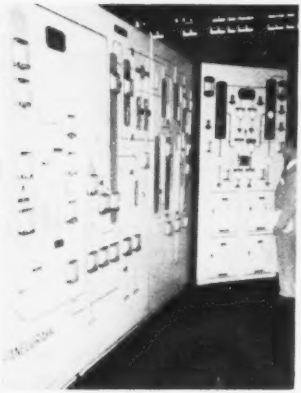
Cleaning and Maintenance

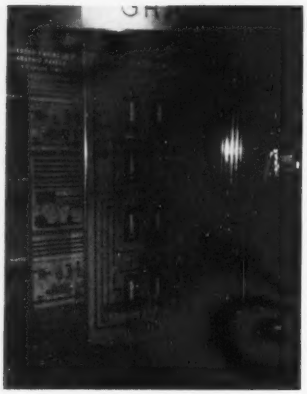
In developing our sanitation and maintenance technics, we followed the same principles as those postulated for the design and installation of the equipment. Definite schedules were set up to break the tasks down into daily, weekly, monthly and biannual operations. The monthly schedule may vary from 3 to 5 weeks, dependent on the effect of weather on our sales—we try to pick a slack day. Other cleaning and maintenance times are scheduled rigidly.

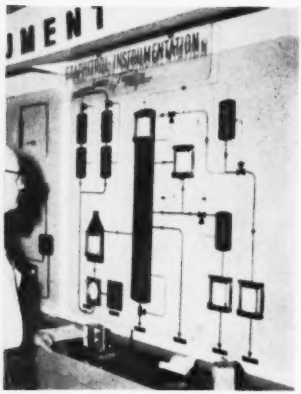
Primarily, the objective of our daily schedule is sanitation. At the close of the run the entire system is flushed

(*Turn to page* 177)

* How company housed its units in this plant is told by the author in an earlier article, page 149 June FE.







GRAPHIC PANELS were a feature of show. These three—Pannelit Inc. (left), Foxboro (center), Taylor (right)—show the miniature indicators, recorders and controllers located directly on diagram portrayals of equipment controlled. (Left, 64A); Center, (64B); Right, (64C)

INSTRUMENTS ON PARADE

Houston Show Reveals Makers' Concerted Effort to "Stay Ahead" of Process Industries' Rapid Evolution . . . Spotlighted Is Use of the Smaller Functional Units, Mounted on Graphic, Central Panels

A TOUR OF THE BOOTHS at the big Sixth Annual Instrument Exhibit in Houston, Tex., disclosed that the graphic panel approach to process control is getting the accent of the engineers.

Such graphic instrumentation basically involves the layout of a process control system in the form of a flow diagram on a central panel. This arrangement permits quick spotting of control action at all points in a complete process—a remarkable simplification of what normally would involve a time-consuming survey of long rows of recorder controllers.

SYSTEM engineering, utilizing new graphic components, is displayed by Honeywell. In plant practice, indicating controller, being adjusted, and miniature recorder (left) are thus located on panel, whereas flow transmitter and control unit (center) are mounted at process. (64D).

The instrument companies have done an epic job in readying a completely new line of instrument types to meet the graphic trend. Beautifully designed miniature indicating and recording units—equal in capability to standard-size instruments—are available to fit the space needs of the graphic panel.

For example, a strip chart recorder-controller, approximately 4 in. square, is offered by several companies. This neatly fits within the outlines of the specific process vessel on the graphic panel.

Readings Transmitted

Concurrent with development of the miniatures is an elaboration of equipment that senses variables directly at the process and transmits readings to the control room. Many booths displayed compact, rugged units, operating on pneumatic or electric principles, for making flow, temperature and pressure pick-ups.

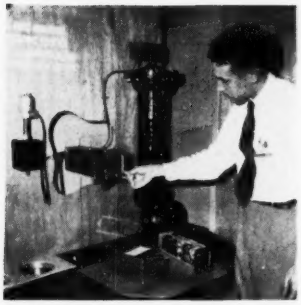
Of the technical papers presented, many concerned the use of servomechanism technics for in-plant supervision of process. Such technics were used in military mechanisms in World War II, such as for accurate, automatic sighting of a gun on a moving target through instant electronic computation of all variables—target speed, gun inertia, wind velocity, etc.

Objective Same for Both

Here, graphic instrumentation and servo-technics have the same objective—to master the growing complexities of process control. But there is an interesting disparity:

Whereas the servo-controlled "push-button" plant would require only an unskilled operator after start-up, graphic instrumentation, on the other hand, relies on a close knowledge of the process by the operator. It is a means of reducing the complex operational information to a simple form for quick evaluation. Visual identification with the process equipment then allows prompt adjustment with a minimum of error and lost time of the various process variables.

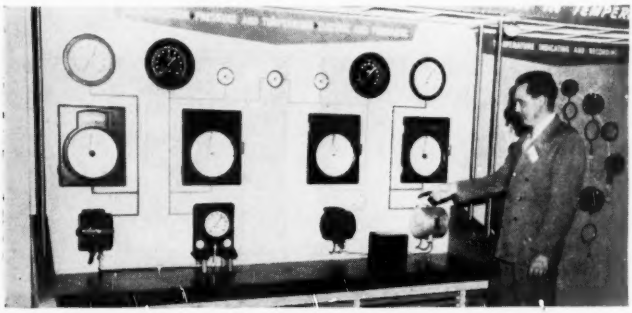
The realistic thought and engineering man-hours being devoted by instrument makers to these two phases of instrumentation indicates that both will soon be in substantial use in the food industry.



ELECTRONIC miniatures were exhibited by Swarthout. Designer, Charles Swartout, adjusts set point of electronic control unit which can be connected with various sensing elements to regulate process variables. (65A)

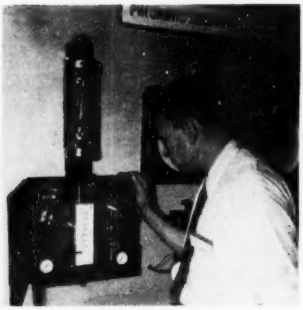
MULTI-FUNCTION pneumatic relay, operating on force-balance principle, is introduced by Moore Products. Unit being adjusted can receive up to three loading pressures and will transmit a single modified pressure. (65B)

AIR-ELECTRIC-AIR transmitting system is new offering by Hagan. Using electronic amplification, system repeats pneumatic signals at distant points as fast as normal air transmission through 5 ft. of tubing. (65C)



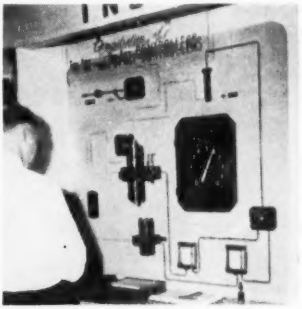
ELECTRIC AND PNEUMATIC transmission of temperature and pressure is displayed in four combinations by Manning, Maxwell & Moore. Transmission systems, left to right: Electronic system for pressure, pneumatic for pressure, electronic for temperature, and combination electronic-pneumatic for temperature. Exhibitor points to hook-up of latter. (65D)

INDICATING pneumatic transmitter was introduced by Helicoid. Unit utilizes a bourdon tube rather than usual bellows. At back are new gages with illuminated dials. (65E)



ROTAMETER transmitter was presented by Schutte & Koerting. A magnetic coupling and specially designed linkage containing miniature ball bearings provides straight-line movement over indicating scale. Unit can be housed above or below meter. (65F)

DIFFERENTIAL pressure transmitter was exhibited by Republic as a density sensing element. Using force-balance principle, unit provides a very stable differential-bubbler measuring system with minimum span of 0.6 in. water and accuracy of 0.5 percent. (65G)

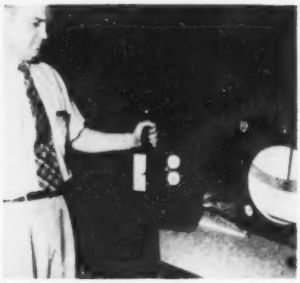


COMPACT stacked controllers were demonstrated by Taylor. "Bi-Act" unit (left of new minature recorders) offers single knob adjustment of both proportional and reset control functions. "Tri-Act" (above) includes derivative function. (65H)

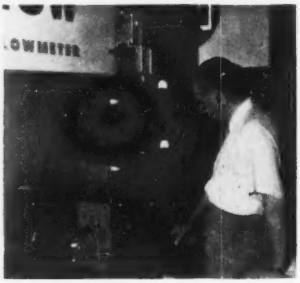
Want more information about any items in this picture article? Just circle key number (in parenthesis at end of each caption) on the Reader Service coupon adjacent to the inside back cover.

Turn Page for More New Units ⟶

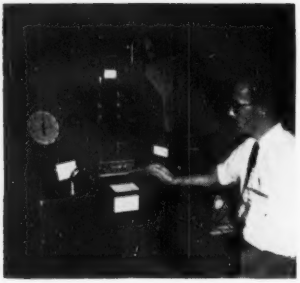
Houston Instrument Show →



KINETIC manometer is a new approach to flow metering offered by Fisher & Porter. Operates around an orifice plate, but pressure drop is measured by direct piping through a rotameter. Said to combine advantages of area meter and orifice meter. (66A)



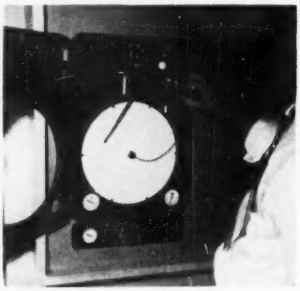
UNIMPEDED flow measurement was revealed by Mittleman Electronics. Based on Faraday's law of electromagnetic induction, unit consists of electromagnet around a flow tube. Moving fluid generates a voltage linear with flow rate in electrodes. (66B)



ELECTRONIC flow meter was presented by Potter Aeronautical Co. Small tube indicated is flow pick-up containing a dynamically balanced rotor and magnet. Rotor spins freely and external coil picks up a.c. signal, which varies directly with flow rate. (66C)

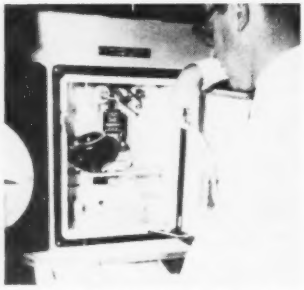
NON-INDICATING pressure controller, shown by Fisher, has new feature—a knob set-point adjustment providing more accurate control settings. Upper right dial shows percentage of scale correlating to control setting. (66D)

PROGRAM controller is feature in Gotham booth. This unit incorporates built-in timer, rate-of-rise control (shown being adjusted), and built-in signal lights indicating each phase of program. Switch in instrument case initiates program. (66E)



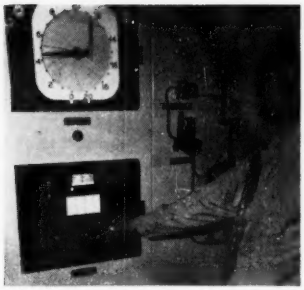
AIR CONTROL unit with full throttling and automatic reset functions has been added to recorder line of American Meter Co. All bellows employed are chrome plated for corrosion resistant service. Case is protected against seep-in of vapors. (66F)

RESISTANCE thermometer controller was displayed for first time by General Electric. This on-off mercury switch controller has an accuracy of 0.5 percent of full scale and employs a 3 ohm resistance bulb. It is available in various ranges from minus-100 to plus-1,800 deg. F. (66G)

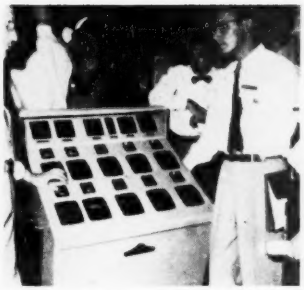


OXYGEN RECORDER, composed of analyzing and recording sections in separate adjoining cases, was shown by The Hays Corp. This analyzer unit employs a balanced bridge circuit with sampling and comparison cells, under a magnetic field, as part of the bridge. (66H)

PORTABLE pH indicator was exhibited for first time by Leeds & Northrup. Shown being adjusted, the unit is designed for plugging into normal 110v. a.c. line. It provides a very high stability by converting, amplifying, and reconverting signal current back to d.c. (66I)

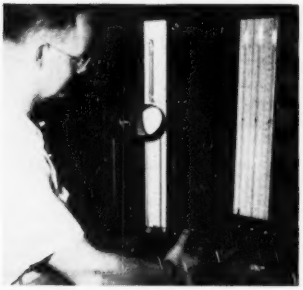


THIS multi-point electronic indicator, with 48 pushbutton station, was displayed by Bristol. Unit is part of new "Dynamaster" electronic potentiometer line. Strip chart, circular chart, and indicating type units all fit in same size case. (67A)

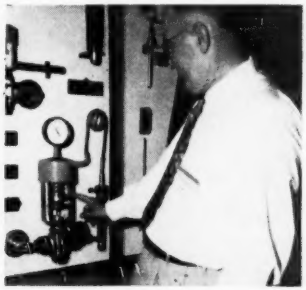


CONSOLE, shown by Bailey, uses small-size units to corral all boiler room controls including draft gaging, onto a single panel. Seated operator can follow and adjust power house operations usually demanding a much larger upright panel. (67B)

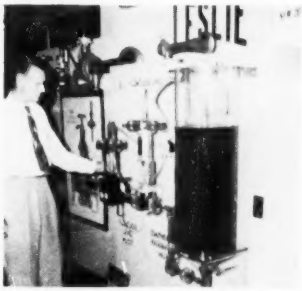
AVERAGING resistance thermometer was put on view by Tag Division of Weston. Small indicator and adjacent selector switch is coupled with a resistance bulb cable assembly to give temperature readings at various levels in grain storage bins. (67C)



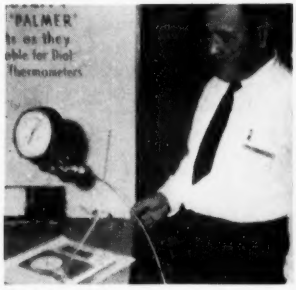
CALIBRATING manometer, operating on null-balance principle, was on display in Meriam Instrument Co. booth. This unit—Model A750 Micromanometer—will calibrate manometers in a range up to 10 in. of water and with an accuracy of .001 in. (67D)



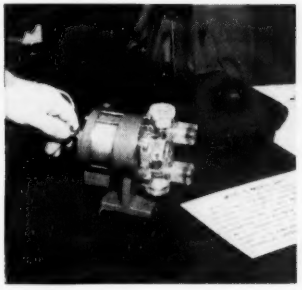
TEMPERATURE regulator with press-formed frame of stainless steel was shown by Fulton-Sylphon. Use of stainless in construction reduced heat conduction from valve to regulator head and affords a reduction in weight and height. (67E)



FLOATLESS level control was demonstrated in a working exhibit by the Leslie Co. Control pilot—shown being regulated—has taps to upper and lower part of diaphragm and controls valve in liquor supply line in accordance with level. (67F)



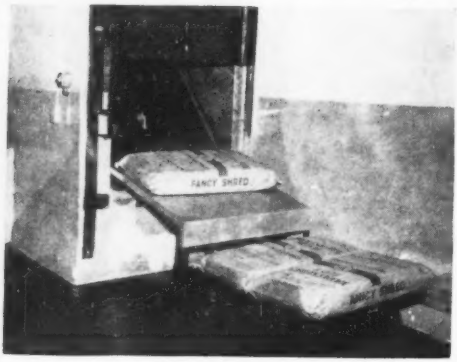
STAINLESS bendable capillary on this new Palmer indicating thermometer allows instrument to be inserted and bent down into tanks formerly inaccessable. Rugged mounting and bonderized, acid-resistant finish makes this unit entirely suitable for outside applications. (67G)



PROPORTIONAL pump which will handle very small flows was shown by Proportioneers Inc. Unit is powered either electrically or hydraulically and is adjustable while in operation. Provides stroking rate of 60 per min. against 50 psig. Unit is equipped with "See-Thru" plastic heads. (67H)

COMPACT Saunders type control valve, displayed by Hills-McCanna, is operated by power cylinder. It provides quick acting on-off service. Various diaphragms are available, and there's choice of body material and trim. In illustration, valve shown is 1½ in. (67I)

Snapshot Trip Through Plant ↓



Plant Built
Speeds Processing

New Jersey coconut company's skillfully planned layout employs latest handling equipment, quickly brings high production with minimum labor

R. J. BODDINGTON
Plant Managers, Wood & Selick Sweetened Coconut Co., Inc., Cranford, N. J.

1 **BAGS** of coconut are raised from 1st floor storage to 3d floor on finger-lift elevator, then stacked on roll-away skids—12 on each skid. This provides an easy warehouse-to-production area transfer requiring only two men.

2 **LOADED SKIDS** are moved to portable elevator and raised to a point where bags can be easily slid onto the 6-ft.-high breaker-feed-table. Electrical outlets at two locations permit operation at several points.

Two points were uppermost when our firm launched its project of a new coconut-production facility at Cranford, N. J.

1—From top to bottom, the plant was to be designed to house our specific operation in the most efficient way possible.

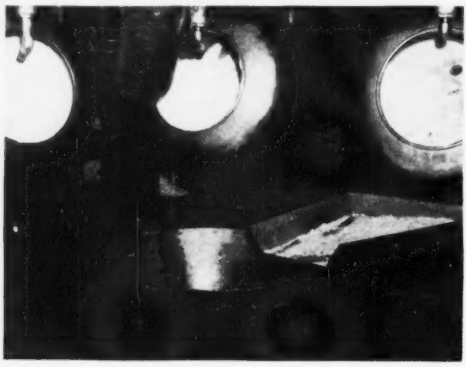
2—It was to incorporate the best engineered equipment and appurtenances to assure top performance in raw-to-finished flow.

Call it "the simp'e approach that pays off"—for that it what it has done.

■ **Today, in but its second year, the new plant of the Wood & Selick Sweetened Coconut Co. is turning out annually 10,000,000 lb. of quality product for the baking, ice cream, and household trade—7,000,000 lb. bulk-packed, and 3,000,000 lb. in household packages—with less than 50 employees all told, and with work on a single-shift 40-hr. schedule.**

Built and equipped at a cost of more than $500,000, the factory is a three-story structure featuring gravity-flow. Manual movement of both raw materials and finished products is here reduced to a minimum by employment of the most advanced materials-handling methods and equipment.

3 **BAG** is slit and compressed block is pushed into modified ice crusher, which shreds the coconut and discharges it into swiveled chute.



4 **ROTATING KETTLES** on 2nd floor (there are two 5-kettle batteries) receive shredded coconut from chute (center) and cook it in sugar-glycol mixture.

To Product
From Floor-to-Floor

Automatic indicating and controlling devices are used to prevent product waste and damage during processing.

Handling Raw Materials

Desiccated coconut is received in 100-lb. multiwall paper bags from two equally modern associated plants in the Philippines. It is brought from the docks to the Cranford plant by rail and truck, is immediately palletized, then moved into the warehouse and stacked.

The two other main processing ingredients—sugar syrup and propylene glycol—are received in tank cars and tank trucks and pumped into the three 6,000-gal. vertical "dish-head" stainless steel tanks located on the first floor. Tanks are equipped with remote-reading King gages mounted on an adjacent panelboard.

Valving is so arranged that one fill line feeds all tanks, and the pump, which normally delivers the sugar syrup to processing, can be used to empty railroad tank cars or transfer material from one tank to another.

A hot water line, connected to the syrup pump, enables thorough flushing out of the entire system.

Propylene glycol is delivered to process through a small Waterous all-stainless pump which automatically maintains the desired level in a 50-gal. float switch-equipped tank on the second floor.

Operations start on the third floor. Here the compressed coconut is shredded, then dropped to the second floor, where it is cooked. And finally it goes to the first floor, where it is dried or toasted, then packed.

Bags of compressed coconut are withdrawn from the warehouse, as required, and moved to the third floor on an endless chain-type finger-lift elevator. The bags discharge over the head of the elevator and slide down a chute onto roll-away skids. One man on the first floor transfers the bags from the pallets to the finger-lift and, similarly, one man on the third floor maneuvers the bags from the chute and stacks them 12 to a skid. By this method, two men can easily handle as much as 24,000 lb. of coconut per hour.

On the third floor the bags of compressed coconut are raised to a 6 ft. high table for feeding to a breaking machine. A skid-handling portable elevator is used for this purpose. The entire skid of 12 bags is placed on the elevator and raised to table height, then the bags are easily slid off onto the table. The elevator can be moved to any point along the table. Electric outlets are provided in two locations to supply power for its operation.

This method of handling reduces manpower requirements to the minimum without excessive capital outlay for equipment, and it has proved eminently satisfactory in practice.

After the bags are on the table, they are slit open and blocks of coconut are pushed into the mouth of the breaking machine, which is, in effect, a modified "ice hog", having two partially meshing spiked cylinders turning at different speeds. After the block is torn apart, the shredded coconut falls into one of two stainless steel chutes that lead to the second floor:

The breaking machine is mounted on wheels so that it can be rolled from one chute to the other as required.

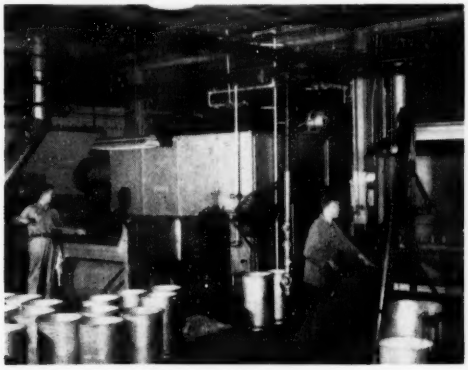
Each of the chutes is angled for swinging in an arc to discharge into the steam-jacketed, rotating cooking kettles. The latter are set in two facing semicircular batteries of five kettles each.

Before coconut is fed to a kettle, the required amount of glycol and sugar syrup is put in it and warmed. Since only a small amount of glycol is used, it is drawn from the previously mentioned float-controlled holding tank and added to the batch by hand. The sugar syrup, however, is metered to the kettles through a recording meter, calibrated in tenths of a gallon. It is only necessary for the operator to open the valve over the correct kettle and press the starting lever on the meter.

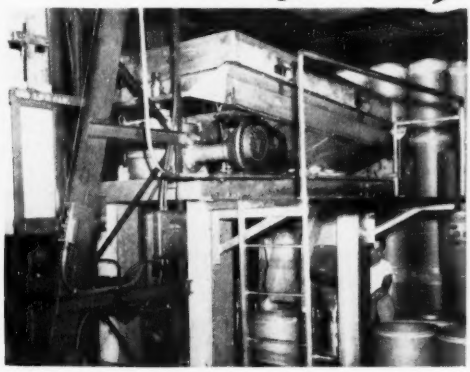
This automatically starts the syrup pump on the ground floor and, as soon as the pre-set quantity has been delivered, the pump shuts off. The operator then closes the valve over the kettle. A spring-loaded check valve above each syrup valve prevents the line from draining after the pump shuts off.

With cooking completed, the coconut is removed from the kettles by hand and dropped into a chute located in the center of the kettle semicircles. This chute empties onto the conveyor belt of a dryer on the ground floor. In this dryer the final moisture content of the coconut is

Turn Page



5 **DRYER** (left) and toaster (right) on 1st floor get cooked coconut from above. Former adjusts moisture. Latter uses gas flame to get desired color.



6 **VIBRATING SCREENS** separate shreds that have stuck together during cooking and drying (or toasting). Then product is ready for packaging.

Three Popular W&S Items

FRESH WHITE COCONUT—the standard bakery and household product specially processed and packaged to retain its fresh flavor and texture

TOASTED COCONUT—to add crunchy, nutty topping to cakes and candies

AND COLORED, TOO—both sweetened and toasted, in four shades, (red, green, yellow and orange) and also multi-colored, for the baker, the confectioner and the ice cream manufacturer

adjusted. Then when the product is discharged from the dryer belt, it falls into a sifter which serves to separate and fluff up any shreds that may have st ck together in the cooking or drying process.

As the coconut leaves the outlet of the sifter it passes over two sets of permanent magnets, for removal of any metallic particles, and falls into shipping containers. Bulk packings are in 100-lb. Leverpak drums and 50-lb. cartons (both polyethylene lined), and in 25-lb. and 10-lb. tins (the latter two sizes being packed in cartons for shipment).

Shipping containers move from the warehouse to the filling point on a roller conveyor. When full, they travel on a gravity conveyor to the stock room, where they are palletized and stacked ready for shipment.

Toasted for Ice Cream

Besides the shredded product, another item in great demand, especially during the summer months, is the toasted sweetened coconut. This is produced in much the same manner as the white sweetened product. However, instead of the moisture being adjusted in a dryer, the coconut is here passed through a natural gas-heated toaster. This unit has a variable-speed belt, and its temperature is maintained within 1 deg F. by the use of instrument-controlled gas-air premix equipment.

Electronic safety devices are incorporated to shut the machine down in case of low gas pressure, or flame or mechanical failure. The fine degree of control afforded by this machine permits production of any shade of toasted coconut, from a very light golden to dark brown.

After leaving the toaster this coconut must be cooled before it is sifted and packed. A unique continuous cooler was developed for this purpose. It consists of a finely perforated belt conveyor that is loaded directly from the discharge point of the toaster and elevates the coconut to the sifter feed.

A housing underneath this conveyor leads to a powerful suction fan that draws room air down through the bed of hot coconut. The hot air from the fan discharges through a duct to a cyclone, outside the building, which recovers any fines that are drawn through the belt perforations.

In the sifter, any lumps are removed which may have formed in the kettles or toaster. And by the time the product leaves the sifter, it is sufficiently cool to be packed.

Colored coconut is also produced—in four shades: red, green, yellow, and orange. It may be noted here that almost any shade can be obtained by the addition of food coloring at the cooking stage. By means of special treatment in the toaster, a crisp, colored coconut is made containing practically no moisture and yet without any change in the color.

Household Packages, Too

In addition to bulk coconut; household-size packages done up in cellophane bags are produced. Since no completely satisfactory automatic packer has yet been developed for shredded coconut, this is a hand operation.

Used is a unitized table conveyor modified to suit the special requirements. And four packing tables, 30x36 in. each, have been added on each side of the table conveyor. Angle cleats, $2x2\frac{1}{2}$ in., are riveted to the conveyor belt at 5-in. centers to support the bags, and the entire length is divided longitudinally into three equal sections by ½-in. rods suspended 1 in. above the cleats.

As the bags are filled, they are placed on the outside sections and move to check-weigher operators, who sit on both sides of the table. They weigh each bag and make quantity adjustments when necessary. Subsequently, each bag is placed on the center section to show that it has already been checked.

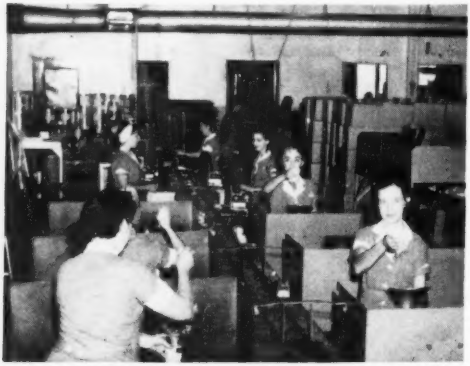
The belt then carries the bags to rotary heat sealers at the end of the line, after which they are hand-packed in cartons for shipment.

A semi-automatic canning line is also in use to package the well-known, extra-moist coconut in 4-oz. cans.

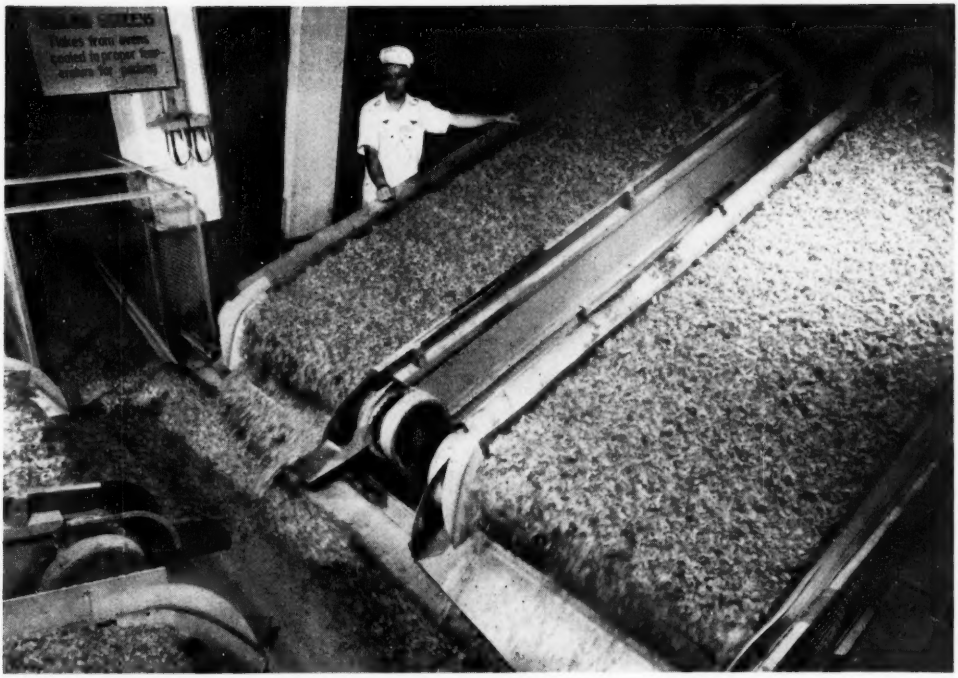
In view of the present shortage of labor—particularly critical in the New York and New Jersey area—the extra thought and the few extra dollars expended in devising methods to eliminate unnecessary manual handling has paid off handsomely.

Snapshot Trip (Cont'd)

7 **POLYETHLYENE** lined drums and cans are used for bulk packing. Here, filled cans are check-weighed, closed, and placed in shipping cartons.



8 **CELLOPHANE** bags are used for household packages. These are filled by hand, check-weighed, heat-sealed and cartoned.



EVENLY toasted and enriched cereal flakes coming from ovens travel along these vibrating conveyors and discharge onto single belt (center). Flakes then go to cooling screens, magnetic trapping pulleys, and packaging.

They Get Uniformity-*Plus* In *High-Volume* Production

Constant improvement in flavoring, screening, enriching, safeguarding, and packaging promotes both quality and bulk economy in highly streamlined Post Toasties process

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Processing of the popular breakfast cereal Post Toasties represents a striking peak of mass food production. Yet despite the huge, fast flow of product, quality is assured "down to the last flake" through advanced technics of control.

Outstanding among the steps promoting both quality and production at the plant of General Foods' Post Cereal Division, Battle Creek, Mich., are the following five fully automatic operations:

A. Metering the syrup flavoring into cookers to produce uniformly flavored cereals.

B. Screening cereal through a double, recirculating system to form uniform-size flakes.

C. Flow-metering the thiamin solution used in continuous spray-enrichment of the flakes.

D. Keeping stray metal out of the product through employment of a magnetic trapping system.

E. Filling cereal into cartons within close tolerance with high-speed company-designed machines.

How these quality promoting technics fit into this cereal-making operation will be brought out as we describe the process.

Hominy grits, the major raw material, is bulk-shipped from the company's Corn Mill Div., in Kankakee, Ill. After arrival at the Post Toasties' plant, the grits are stored in concrete elevators holding 6,000,000 lb. To prevent over-heating, the grits are frequently turned during storage.

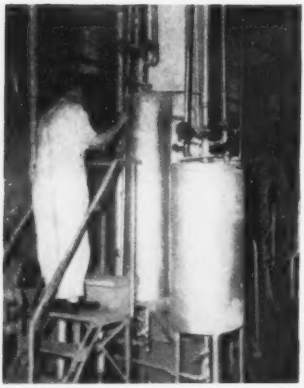
Once the grits are called for from storage elevators, it takes only 16 hr. before they are packaged as flakes.

First, the grits are elevator- and belt-conveyed to a concrete storage tank atop the building. From here, a screw conveyor feeds them as needed, into metal measuring hoppers poised over 46 aluminum rotary cookers.

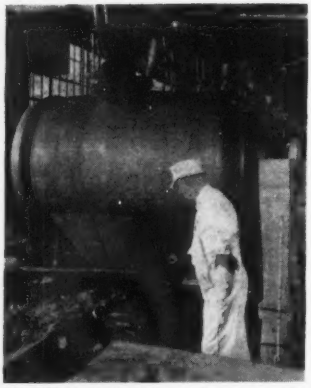
Making the Syrup

Flavoring syrup for "batching-in" at the cook is made up in a 1,000-gal. rotating steam-coil vat. Into this

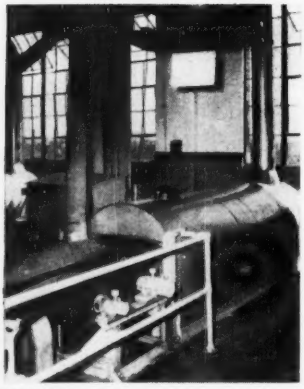
POST TOASTIES: From Hominy Grits to Toasted Flakes



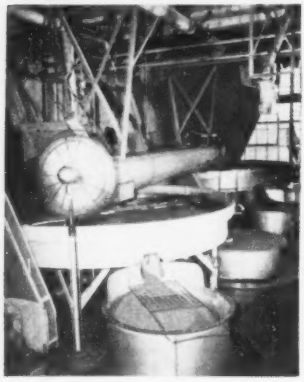
MEASURED in two 45-gal tanks, syrup is piped directly into cookers, each containing 1,700 lb. of grits.



STEAM-COOKED for 180 min., grits are discharged from rotary cookers operating in closely linked sequence.



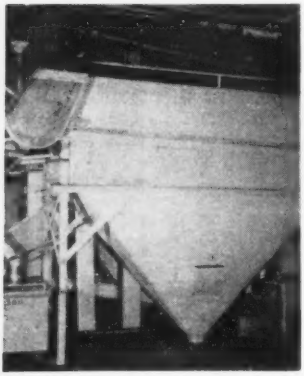
COOKED GRITS are conveyed through rotating wire-mesh reels. Lumps taken out are ground.



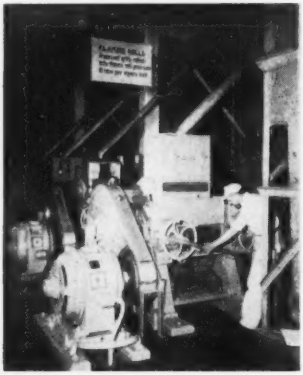
FROM these circular coolers with revolving sweeps, grits are fed into 3-story dryers (floor).

DRIED to an 18-percent moisture content, grits are here discharged from vertical dryers, ready for curing.

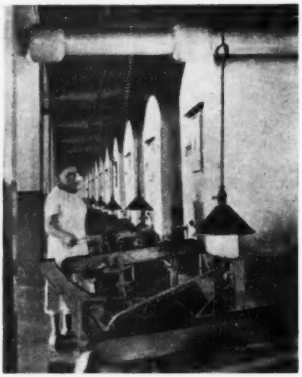
MOISTURE in grits is equalized after 6-7 hr. in these curing bins that hold 77,200 lb. of cereal.



GROUND in hammer mill (lower right), grits go to this grading reel that removes any oversize particles.



GOING next to these high-pressure-water-cooled rolls, screened grits are shaped into flakes.



IN THESE gas-fired ovens (550 deg. F.), cereal flakes are dried to 3 percent moisture content in 3 min.

stainless steel unit go sugar, salt, dextrose, malted barley, corn flour, and the vitamins (niacin and riboflavin). Each batch of syrup is then gravity-fed into a 10,000-gal. glass-lined basement storage tank. As called for, this flavoring is pumped into a 278-gal. secondary storage tank near the cookers.

In running a cook, 1,700 lb. of grits are dumped into a cooker and syrup is then introduced through measuring tanks and piping. A 180-min. live steam cook, at 19 lb. of pressure, imparts a translucent, golden-brown color and soft adhesiveness to the grits.

They are next belt-conveyed to two wire-mesh reels that break up the adhesive mass into small particles. Lumps not passing through the reels go to a hammer mill, then are re-screened. At this point, a magnetic pulley removes possible metal fragments.

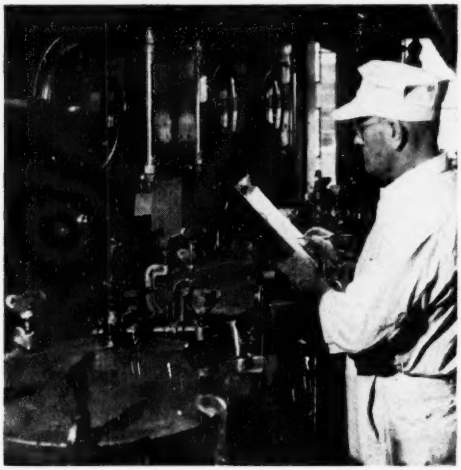
Leaving the reels, the grits are bucket- and screw-conveyed to four 12-ft. dia. flat-bed coolers. Equipped with revolving sweep arms, these units distribute the grits to the floor-level mouths of 16 vertical hot-air dryers.

Units Are Triple-Story

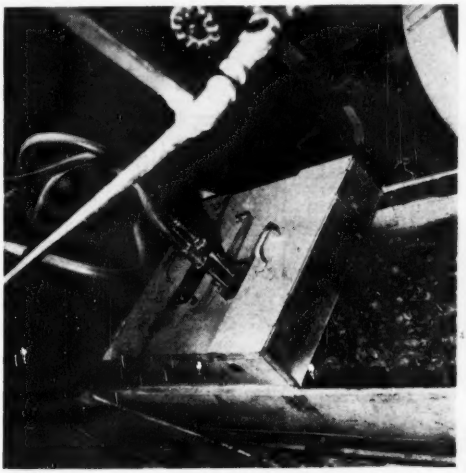
Cooked grits then fall unimpeded through the battery of three-story-high Silver Creek dryers. Steam-heated hot air, flowing upward to meet the descending grits, reduces the moisture content of the product to 18 percent.

Comprising long tubular chutes equipped with vapor exhaust systems, these driers are located in an insulated, portioned-off area, with wire-grate

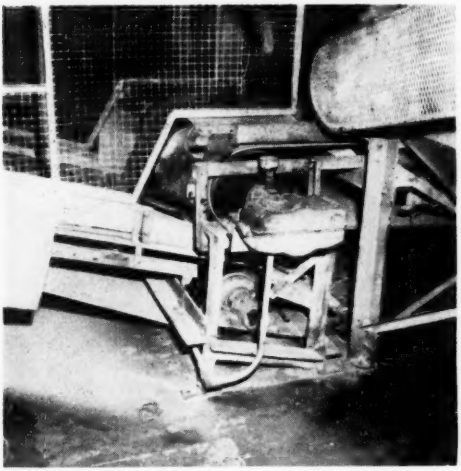
Enrichment . . . On to Packaging



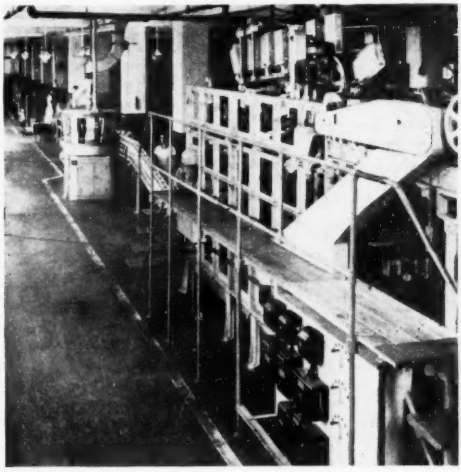
FLOW-METERS automatically control enrichment of oven-toasted flakes. Vitamin feeder tanks are below panel.



AS FLAKES are conveyed under spray heads, they are continuously coated with solution of thiamin (vitamin B_1).

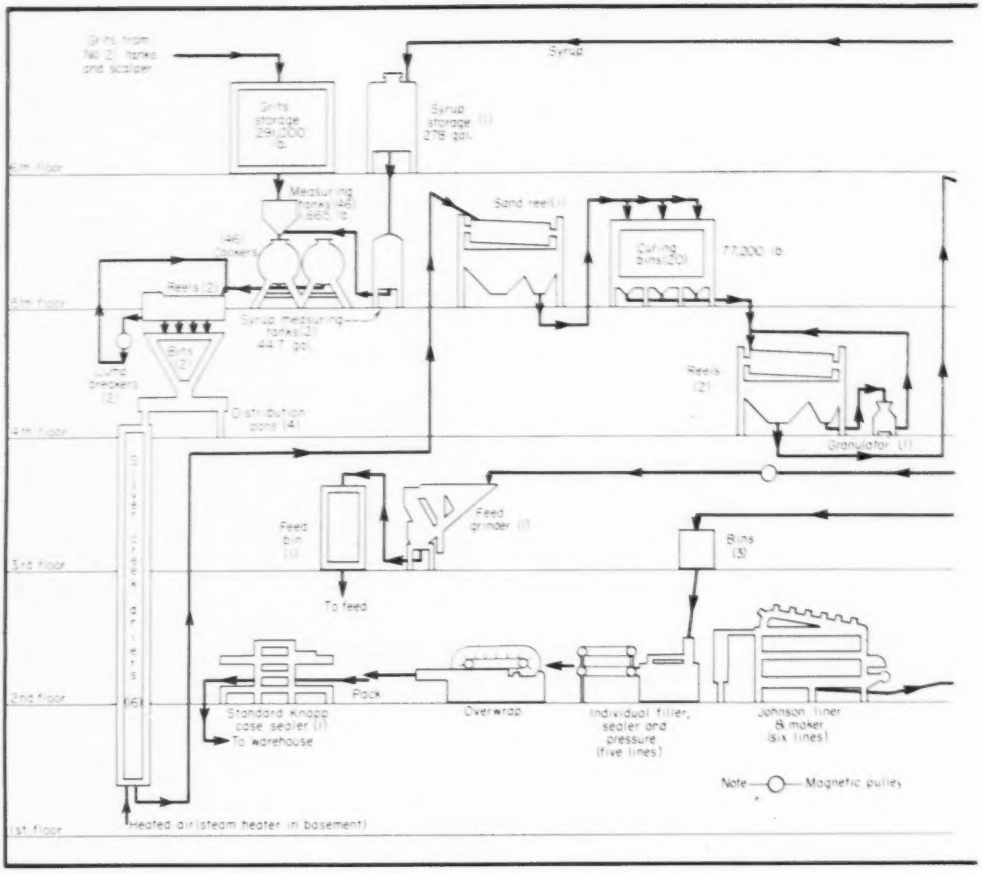


MAGNETIC PULLEY removes stray metal particles from product. Installed in process are three such units.



MACHINE (right) forms cartons and inserts liners into them. Then cartons go to company-designed filler (left).

Flowsheet Shows in Graphic Detail



floors assuring a high ambient temperature around them.

The partially dried grits are now bucket-conveyed four stories to a small-mesh rotary screen that removes dust and fine particles. From here, the product is bucket-hoisted and screw-distributed to 20 wooden curing bins.

These bins hold 77,200 lb. of grits. After a 6-7 hr. cure, the moisture content of the grits is stabilized at the 18 percent level. A uniform temper in the product assures successful results at the flaking rolls.

After the curing, the product passes through a double screening system. First, there is the classification wire-mesh reel, where oversize particles are removed, subsequently to be reduced by a hammer-mill granulator and recirculated. Second, there is the small-mesh rotary screen that takes out the fines.

Uniform-size grits next travel over a belt and another magnetic pulley before going into control feed hoppers serving the 42 flaking rolls. Each of the latter units has two rolls, and operation is under a pressure of 18 tons per square inch. Rolls are water-cooled to prevent heat damage to the grits, which emerge as large, soft, moist flakes.

Snouts carry the moist flakes to 42 toasting ovens, on the floor directly below. Each gas-fired oven has a ribbon burner that encloses a 30-ft. baffled, perforated metal cylinder. Pitched rotation of this cylinder moves the grits from feed to discharge end in 3 min. A temperature of 550 deg. F. toasts the flakes to the characteristic golden color, at the same time reducing the moisture content to 3 percent.

An enviable record in product uniformity is attained here by a rigid inspection routine. Adjacent to the discharge gate of each oven is a standard color sample of toasted flakes. Frequent spot checks are made by the attendants, and when necessary they adjust toasting time and temperature.

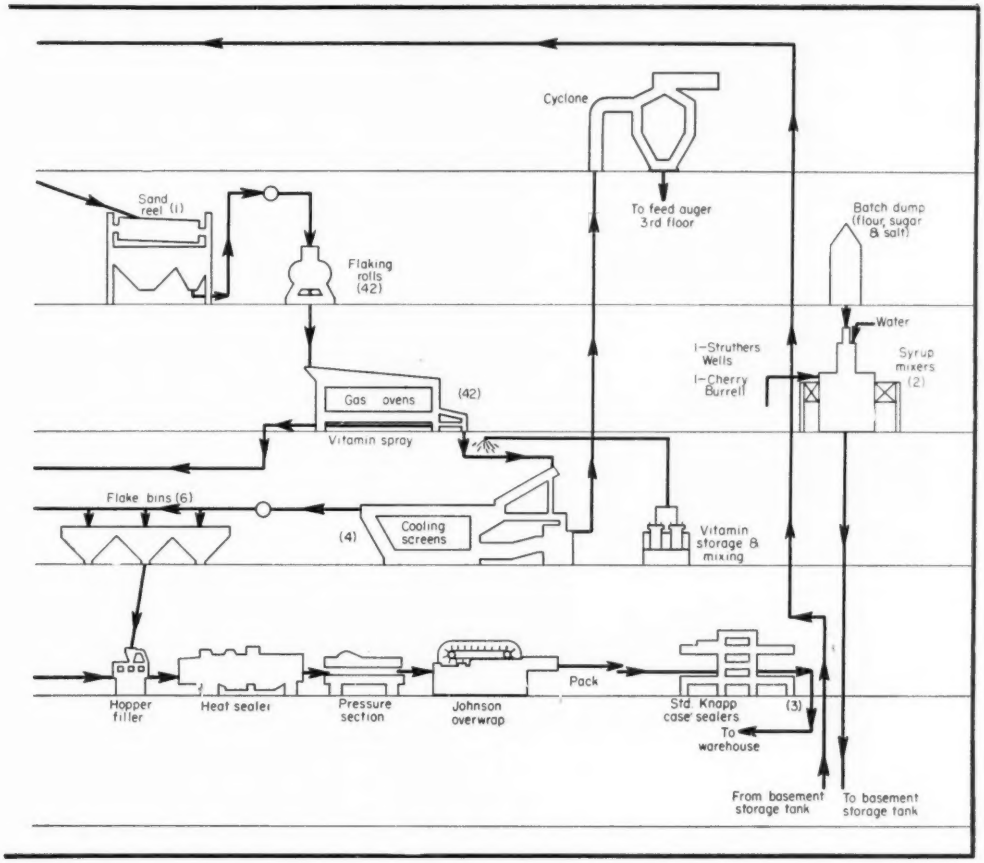
Furthermore, there is a daily multi-sample inspection-board test to catch any gross changes in color and crispness.

Enrichment is Automatic

Toasted flakes funnel from the ovens over short vibrating conveyors onto a single slow-moving canvas belt. While traveling on this belt, thiamin (vitamin B_1) solution is continuously sprayed onto the flakes through four permanently mounted nozzles above the conveyor.

Addition of the thiamin is automatically controlled. From its storage in a stainless steel vat, the vitamin concentrate is fed to eight stainless feeder vessels located below the flow-control panel. The feeder desired is

Operations on High-Production Line



valve selected, and air pressure then forces the vitamin solution through a plastic hose to the four spray-heads.

There is an orifice plate in each vitamin-flow line, and a pipe manifold runs to the four panel-mounted flow recorder-controllers. Thus, any deviation of vitamin flow to the flakes is quickly adjusted by the controllers, for air pressure to the feeder vessel is then automatically regulated to speed up or slow down the introduction of thiamin solution.

Enriched flakes then pass over a reciprocating spreader feeder onto four inclined endless wire belts, serving as cooling screens. Suction, applied at the screens by 40-in. fans, dries and cools the flakes for packaging. Package-ready flakes then pass over a belt and final magnetic metal trapping pulley before spouting to nine flake-storage bins above the packaging floor.

Cartons and liners are manufactured, also overwraps printed, in the company's Carton & Container Division in Battle Creek. Huge quantities of these materials are stored adjacent to the packaging operation to supply the eleven high-speed filling and packaging lines.

Six Battle Creek Wrapping Machine Co. units form and line cartons for one 14-oz., three 12-oz., and two 8-oz. filling lines. Speed of each carton former is 70 a min. Special company-designed fillers are employed on each line. After the cartons are heat-sealed they pass through Battle Creek over-wrap machines.

The familiar consumer cartons are then packed in shipping containers, which are pressure-roller conveyed to three Standard-Knapp case gluers and sealers prior to delivery into the storage space or shipping platform.

Five 1-oz. packaging lines employ Pneumatic Scale Co. fillers. Here, each line turns out 75 single-portion containers per minute. All 1-oz. cartons are machine-wrapped in cellophane by Scandia units, then funnel through a packing station and into a single Standard-Knapp case gluer and sealer.

Check weighing plays an important packaging role. Built into the moving package line just beyond filling and prior to sealing, is an automatic weighing system designed to eject over- or under-filled cartons. Furthermore, a girl stationed at a master check-weigh scale makes periodic extra-precise (to within 0.1 oz.) determinations of the filling accuracy.

One product "boomerangs" to Kankakee, where the parent grits originated. This is a material consisting of fines from screening and the broken flakes from the toasters. Traveling a separate route in the Battle Creek plant, these are first ground and bin-stored prior to bulk-shipment to Kankakee, where they are made into a feed byproduct.

CHEESECAKE (on the lab bench) is baked daily to test E-Z Cheez flavor and quality. Recruits for sampling, never hard to find, are not always as pretty.

To assure acceptance of its new powdered cheese, Borden's put the emphasis on fixed quality—winning it by giving hawk-like attention to all processing phases, and then following up with exhaustive lab-baking tests

NEW PRODUCT?

Then Uniformity Is a Must

FE STAFF

One thing is certain to the maker of a new food ingredient—commercial users are tough to please.

Like the housewife, a processor can show plenty of enthusiasm for something new and different. But if volume-quality strays from the excellence of that first sample—beware. That may presage the end of future sales.

■ **In short, food plants have too much at stake to risk the success of new products on non-uniform ingredients.**

So when Bordens' new spray-dried baker's cheese was placed on the market a few months ago, its planners had one primary concern—product uniformity. Here, a superior new form of cheese had been developed. It had "fixed" qualities and could be used in measured fashion. And this necessitated a manufacturing process closely meshed with laboratory control to keep this uniformity factor from batch to batch.

In keeping with this philosophy, Borden's oriented its product and process around two important checks:

1. A step-by-step charting of process conditions, with integrated laboratory evaluations for each batch.

2. A final baking test, using several formulas, to evaluate flavor and consistency in finished goods before any batch is released for sale.

How It Developed

Before describing how spray-dried cheese is made, the background of this unique product may interest the reader. Development stemmed primarily from baking industry requests. Bakers, although aware of cheesecake's high consumer appeal, often shied away from this product—it wouldn't turn out the same from day to day.

Difficulties were mostly due to a lack of uniformity in the wet cheese they used. Variations in cheese consistency, moisture content, and acidity all tended to upset an established baker's formula.

Further, in areas of insufficient milk—the South, for example—cheesecake is little known. No milk has been available for baker's cheese, and refrigerated shipments of the wet product have not been justified.

So a spray-dried product—called E-Z Cheez—was developed in answer to specific requests for a cheese:

1. That could go into a formula by exact weighing.

2. That could be shipped and stored without refrigeration.

3. That had fixed acidity, moisture content, and flavor.

Going to the powder form provided an ideal answer to the first two specifications. And the third—so important to uniform baking results—is met by the fixed character imparted to the product by a careful and comprehensive quality control program.

Into the Vats

The recently developed E-Z-Cheez process starts out in a conventional manner, but it soon introduces novel practices. Here is a quick picture of the operation:

Insulated tank trucks from Borden's Fluid Milk Division plants each day deliver fresh skim milk to the Elgin, Ill., plant, where it is pump-discharged into stainless steel storage tanks. When this milk leaves the storage tank for

cheese making, it is pasteurized in a tubular heater and cooled by a plate unit.

Jacketed vats set the cheese. These are filled with an exact quantity of pasteurized skim milk early in the morning. Temperature is stabilized, and the batch is inoculated with starter. Several minutes of gentle manual stirring mixes-in the culture.

Once the vat is set, it is covered to protect the contents while the curd forms. During this coagulation period, temperature is frequently checked and water circulation to the vat jacket regulated, if necessary, to preserve optimum conditions.

There are also periodic sample titrations to check acidity during the setting period. Duration of this period depends on the amount of acid that develops. If acid is insufficient, the curd can be grainy or rubbery. An excess, on the other hand, can overemphasize flavor and cut down yield.

Once setting has terminated and the curd is ready for further processing, the unusual part of the operation starts. For what has preceded more or less simulates manufacture of regular baker's cheese. But with the curd ready to remove, the product starts to flow on a continuous basis. And this effectively eliminates the most difficult and tedious part of the old process.

Consider, categorically, the old way of finishing up baker's cheese:

1. Curd is dipped from the vat and loaded into 50 lb. muslin sacks. These are tied and spread on a rack to facilitate whey drain-off.

2. Cheese bags are then turned about every 30 min. to speed the draining action.

3. Bags are then piled to press the curd. Ice layers are spread between bags to check acidity development.

4. Curd is removed from bags (it may be salted) and then is milled to achieve smoothness. Packing follows.

5. Sacks must be washed and thoroughly sanitized after use. Otherwise, yeasts and molds in the cloth contaminate the cheese.

All these tedious manual operations —with rather vulnerable points for product damage—have been eliminated in the following manner:

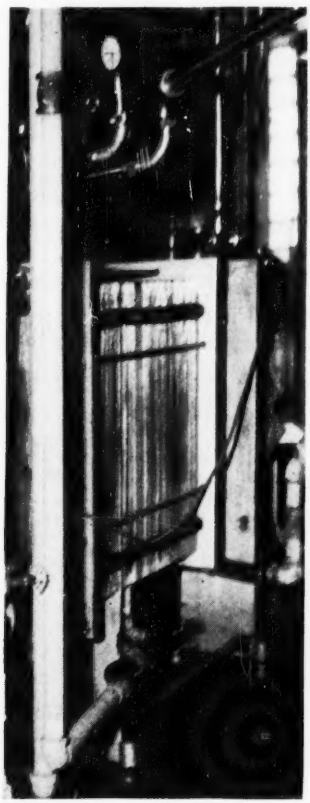
First, prior to draining the vat, the curd is cut by hand-wielded knives. This speeds the draining operation by forming the curd into small pieces, which settle to the bottom of the vat.

After cutting the vat contents receive a slight cook to improve curd texture. Whey is then drained through a sieve and the curd pumped to a tank for special processing to ready it for drying.

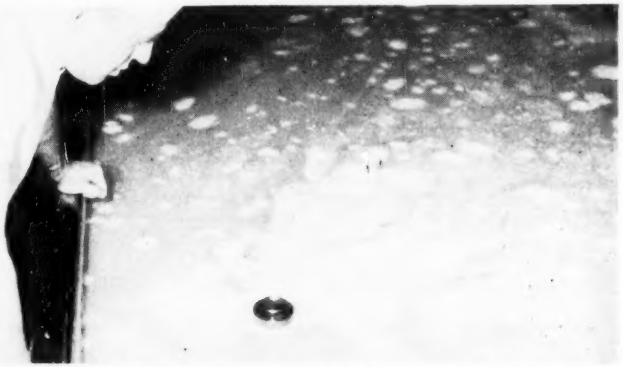
Several control devices are used to keep variables out of the drying operation. A non-indicating controller regulates the temperature of incom-

(*Turn to page* 165)

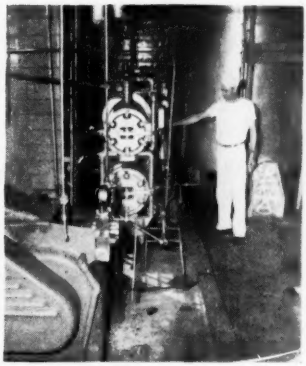
Sharp Eyes On Every Step



1 **MILK** is pasteurized and cooled in this Pfaudler unit, then run into jacketed cheese vats for setting.



2 **TEMPERATURE** of milk in vat is carefully checked by floating thermometer, then starter is added and thoroughly mixed by manual stirring.



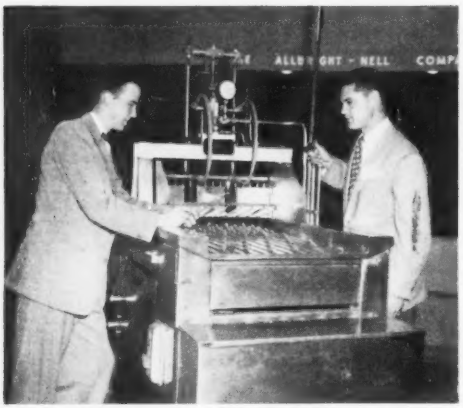
3 **BULK CURD** is cooled in tank (rear) then delivered to spray dryer by high-pressure pump (foreground).

4 **CONTROL** devices regulate temperature of incoming and outgoing air to achieve fixed moisture content.

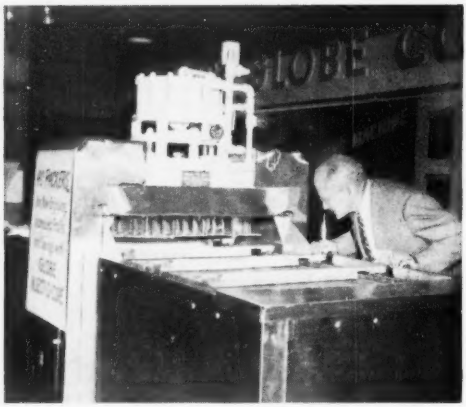
Latest Meat-Processing Units

FE's Roving Camera Brings Into Focus

New Bacon-Curing Machines



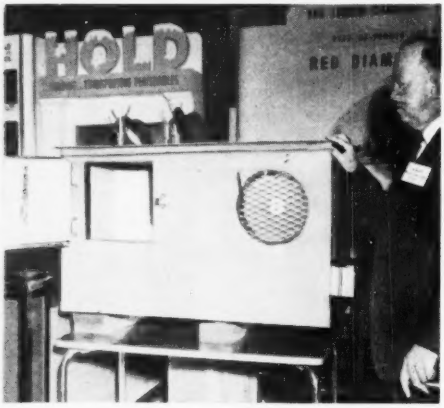
COMPACT UNIT needs only 16 needles for injecting pickle into bellies, bacon squares, and jowls. Meats are continuously conveyed to the injector mechanism that needle-pumps pickle into them. Amount of cure is easily adjusted. Stainless unit is specially designed for recovering excess pickle.—Allbright-Nell Co., Chicago. (78A)



THIS Inject-O-Cure machine was the first developed for quick curing of bacon—24-48 hr. instead of 18 days. Bellies are push-bar conveyed below pneumatic cylinder, operating 101 injecting needles that force pickle into meats to assure a uniform cure. Unit pumps about ten bellies per minute. Maker: Globe Co., Chicago. (78B)

Specially Designed Dry Ice Refrigerating Units

CARGO COOLER provides controlled dry-ice refrigeration and circulation of cooled air throughout load. Cooler consists of a welded aluminum bunker with finned exterior surfaces. Unit holds 600 lb. of dry ice on its three ¼-in. thick, sealed, aluminum shelves. CO_2 gas may be discharged around cargo or vented to outside by means of a damper control. Exhibitor: Hunter Mfg. Co., Cleveland. (78C)



TRANSPORT refrigerating unit, specially designed by Dyna-Kold Corp., San Francisco, employs finned evaporator coil, operating with Freon. Flow of refrigerant is regulated by thermostatically operated selenoid valve. Fan force-circulates cold air to assure even temperatures. Heat, absorbed by refrigerant, is removed by dry ice instead of conventional mechanical condensing unit. (78D)

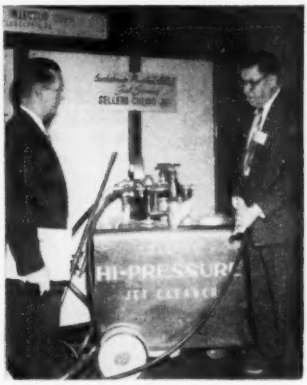
Displayed at AMI Convention

Advanced Equipment for the Packers

Latest Insecticide Devices and Efficient Jet Cleaner

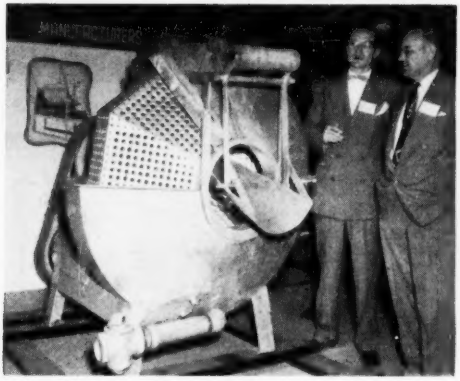
INSECTICIDE dispenser, shown by Aero-Sanitation Co., St. Louis, can be plugged into electrical outlet. Timer is set, then within a few minutes thermal unit reaches 565 deg. F, and emits lethal fog generated from 2-gal. stainless insecticide tank. (79A)

MECHANICAL generator, shown by Silver Creek Precision Corp., Silver Creek, N. Y., instantly forms aerosol insecticide fog without using heat or steam. Insecticide is drawn from container by two whirling disks which fog-dispense it in room. (79B)

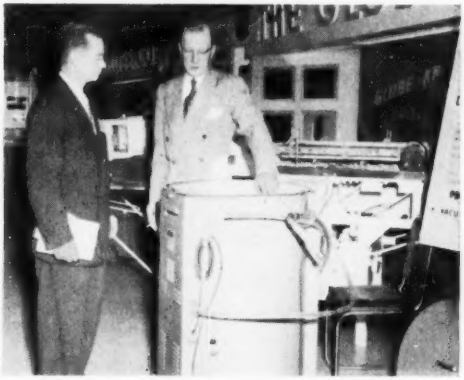


HARD-TO-REMOVE films are whisked off surfaces with new Chemo-Jet. Dual unit applies detergent as fine mist. After film softens, high pressure jet attachment banishes it. 175 gal./hr. of solution may be sprayed — Sellers Injector Corp., Philadelphia. (79C)

Advanced Tripe Scalder, Fat Filter



PERFORATED rotary drum washes and scalds tripe, stomachs, and chitterlings. Unit features automatic unloader that cuts discharge time from 15 min. to 15 sec. It uses only half amount of water and cleaner commonly employed. Cincinnati Butchers' Supply Co. is maker. (79D)



OPEN-TANK vacuum unit filters 500 lb. of frying fat in a few minutes. Requires only single filter paper and 1-lb. filter aid per barrel of fat. Change of filter and aid takes less than minute. Portable unit saves man-hours and materials.—Vacuum Filter Mfg. Co., Chicago. (79E)

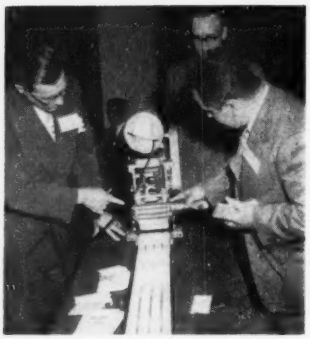
Want more information about any items in this picture article? Just circle key number (in parenthesis at end of each caption) on the Reader Service coupon adjacent to the inside back cover

Turn Page for More New Units ⟶

Speedy Packaging Equipment

AUTOMATIC slicing machine handles two meat loaves at a time. Unit cuts meats at rate of 128 slices per min. and makes double stacks of 4—16 slices. Exhibitor: U. S. Slicing Machine Co., LaPorte, Ind. (80A)

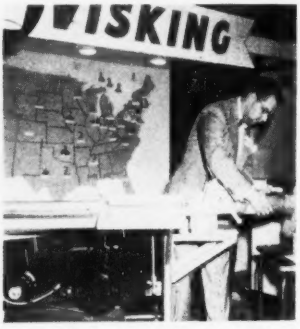
SCALE & SEAL UNIT is mounted to speed weighing, assembling of package, and sealing of wrap. Unit is fitted with sealing roll having cartridge-type heater.—Great Lakes Stamp & Mfg. Co., Chicago. (80B)



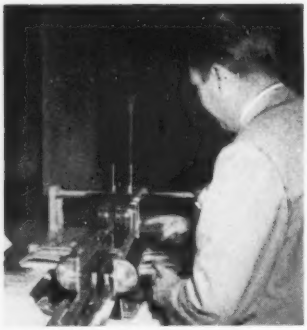
NO-SKIN pork sausage dispenser, hooked to stuffer, extrudes six 18-mm.-dia. skinless links at a time onto roll-fed paper. Unit can be adjusted to form 2½ to 5-in. sausages. Displayer: Dohm & Nelke, Inc., St. Louis. (80C)

CRY-O-VAC bagging machines. Extreme right: Standard-Knapp vacuum sealer. Center and left: Dewey & Almy machines vacuumize, twist, and clip-seal the bags. Sealed bags then go to shrink-tank. (80D)

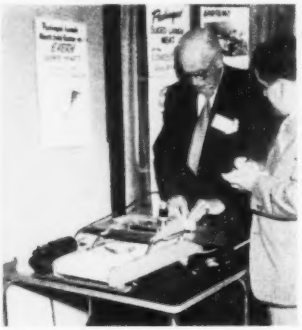
LINKER-FILLER, displayed by Globe Co., cases midget items. Attached to stuffer, device injects measured amount of meat into 50-ft. casing. Stuffed meats are then twisted to form links and finally clip-sealed. (80E)



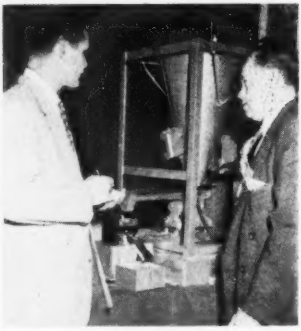
DISPLAYED in Visking Corp. booth was pneumatic loaf and smoked meat stuffer. Foot-pedal operated, unit includes ham stuffer, also feed table. Meats are stuffed under 100 psi.—R. W. Tohtz & Co., St. Louis. (80F)



NEW Corley-Miller unit receives pre-banded packages of franks or sliced meats and end-seals them at rate of 35 per min. Unit handles tray or boxed goods, using heat-sealable film. Displayed by Miller Wrapping & Sealing Machine Co., Chicago. (80G)

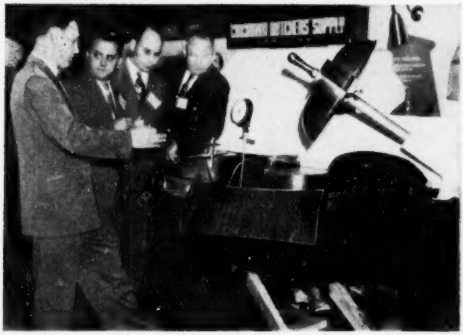


BELT HEAT-SEALER, displayed by Miller & Miller, Inc., Atlanta, consists of a short neoprene feed conveyor and suspended adjustable heat-sealing plate. Temperature of plate is thermostatically controlled. Unit seals film-wrapped meats, applies labels. (80H)

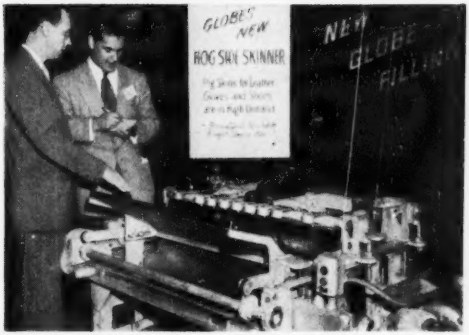


FAST accurate weighing of small-volume ingredients with new unit. From hopper, ingredient is uniformly fed by vibrating conveyor into tilting dump-scoop on scale. Scoop is emptied electrically at preset weight.—Exact Weight Scale Co., Columbus. (80I)

Other New Equipment for Packers

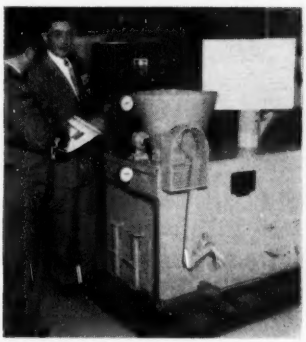


SPECIAL sausage-meat cutter, exhibited by Cincinnati Butchers' Supply Co., features fewer knives, with each shaft having two double-edged blades. Thus, cutting capacity is raised without temperature rises. (81A)



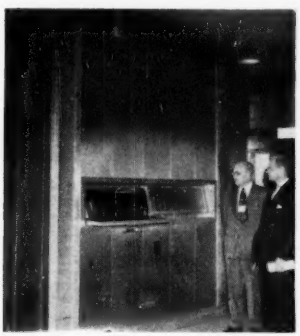
NEW hog-side skinner was developed by Globe Co., Chicago, to give packers added profit item and tanners new source of hides. Teeth on rotating drum grip hide as stationary knife cuts off fat. Capacity: 800 per hour. (81B)

COOK-RIGHT control indicates by electrically actuated gage when preset end-point of batch is reached. Sensitive element in cooker varies current flow to meter according to moisture content of material processed.—The Globe Co., Chicago. (81C)



MECHANICAL smoke generator consists of air-driven, motorized agitator designed to prevent packing of sawdust and formation of "blow-holes." Serves 4- to 6-cage house. Runs 4½-5 hr. without attention. Maker is Drying Systems, Inc., Chicago. (81D)

AIR-DRIVEN portable saw (right) can be hot-water sterilized, since motor is not harmed by moisture. Electric saw (left) has compact axial air-gap motor and special blade guard for on-the-rail handling of beef.—Kentmaster Mfg. Co., Los Angeles. (81E)

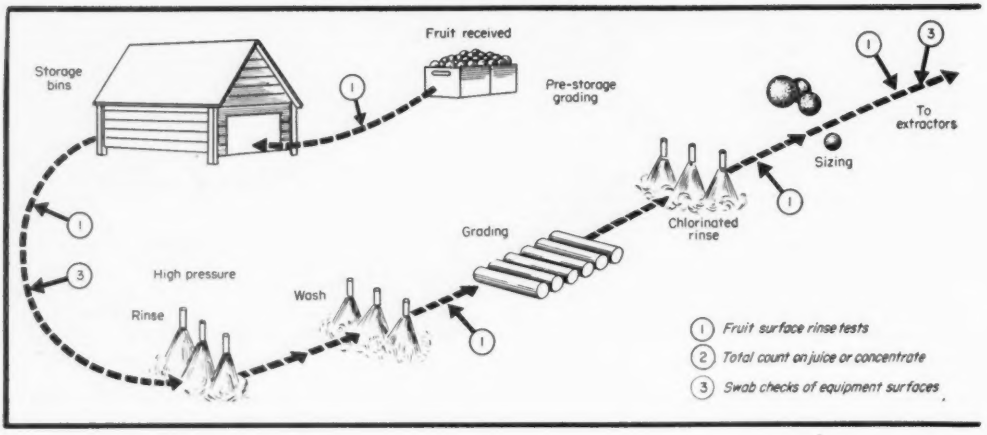


TRAVELING-TRAY OVEN is clad in front with rigidized stainless steel sheet, designed to reduce reflection and eliminate greasy fingerprints. Sheet is 4 gages lighter, yet termed as strong as former untreated one.—Advance Oven Co., St. Louis. (81F)

ELECTRIC hog scraper and finisher (A) does better job in less time than conventional hand tools. Captive-bolt pistol (B) fires blank cartridge that drives bolt into animal's brain. Stunned animal is relaxed.—Koch Supplies, Kansas City, Mo. (81G)

THIS semi-automatic beef-head splitter is specially designed for safety. Machine is protected from jar, vibration, and corrosion of daily use by rigid, cast-iron construction. Unit is manufactured by Cincinnati Butchers' Supply Co., Cincinnati. (81H)

Getting the Fruit Clean . . .



How Frozen-Concentrate Biochemists Are—

Working Out the *Fruit* Bugs

Facing entirely new problems with product organisms, they've devised the special technics detailed here — and now assure cleanliness of fruit and juices before and during processing

C. G. BEISEL
Director of Research and Development, Real Gold Citrus Products, Anaheim, Cal.

Because of the many unique quality problems faced in the frozen citrus concentrate field, technologists have had to do some fine focusing. Indeed, they have had to "write their own book" on microbiological control for this "Cinderella" of the citrus industry.

It is the absence of heat treatment, commonly used to inactivate enzymes, destroy microorganisms, and stabilize colloidal materials that has necessitated the new concepts of sanitation and product control.

The problems encountered have paralleled those of the frozen food field in general, due to the incidence of entrained organisms. But the specific types of organisms found, and the control technics required, are unique.

It is true that a majority of the microflora will not be viable after prolonged storage at 0 to —10 deg. F.[1, 2, 3] However, those bacteria and yeast that do survive may have an influence on quality or physical stability if present in significant numbers. The earlier work of Teunnisson and Hall[4] is of interest. Working with 56 mixed slant cultures obtained from many parts of processing plants in Florida, they isolated 75 distinct growth types —26 of them bacteria, the others being yeast, yeast-like organisms, and fungi.

The following comment of the authors is significant: "The bacteria studied in this investigation were found to belong to groups of microorganisms whose usual habitats are air, water, dust, soil, sewage slime, human skin, mucous membranes and wounds, grains and plants, intestinal canals of man and animals, decomposing organic matter, and the soft rot of vegetables and fruits."

Also, they noted that: "*Aerobacter aerogenes* was isolated more frequently than any other single type of bacterium. This organism may be deposited in the processing operations. It may either be washed off the outside of sound fruit or from the rotted parts of bruised or over-ripe fruit, or it may be brought into the plant in the wash water if this comes from some source polluted with sewage."

Examine Fruit When Received

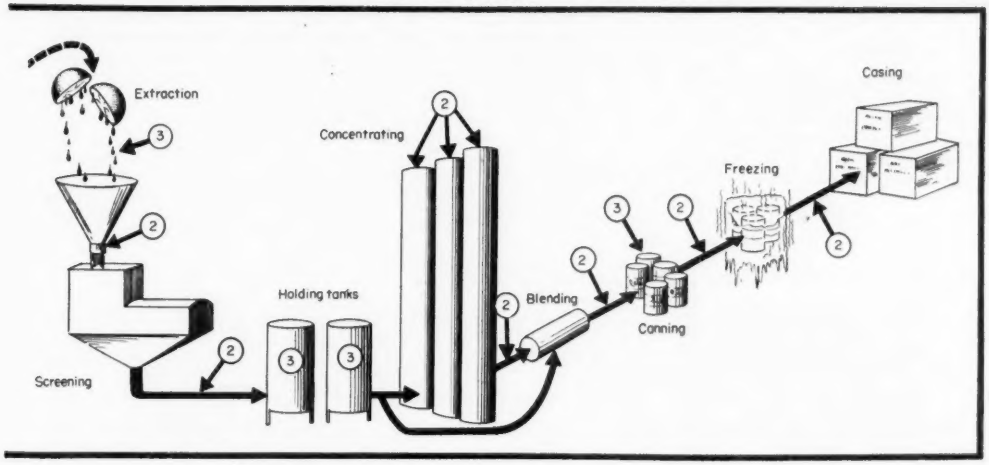
Our first consideration of microbiological control should be directed to the determination of the nature and magnitude of the primary microflora —that found on the whole fruit. In-plant sanitary precautions can be of little avail if the contamination on fruit surfaces is very high. Associated are the technics of storage, washing, and conveying of the fruit, and their influence on microbial population levels.

Sampling of fruit is necessary to determine the potential total count within the process. And most workers seem to be in accord that, to be representative, sampling must be done on the fruit as it is unloaded.

But actually what is a representative sample?

Certainly, it is impractical to sample bacteriologically a sufficient number of fruit to be considered statistically significant. Furthermore, the condition of the load is of major importance.

T. M. Lukes,[5] reporting on 45,000 tons of fruit, observed a direct correlation between percent grade-out of defective fruit and total count trends in the juice processed from the same load. This was substantiated by earlier observations of Beisel and Lukes, when fruit from a marked load was arbitrarily sampled after grading (using a fixed pattern), and the sample juiced



in the laboratory under sterile conditions. Sixteen loads were thus examined, and in all cases, the internal quality of the fruit was directly related to the external condition of the load on receipt.

Wolford and Berry[6] examined juice prepared experimentally from "soft rot" Valencia oranges, and they found it to contain a microbial population 2,500 times that of juice similarly prepared from sound fruit. The coliform content was also much greater.

Experience within several organizations indicates that 12 pieces of fruit from 15 tons of sound receipts will give a fair picture of the microorganism load on the surface. However, it is impossible to say what is a good working sample on loads containing a high percentage of defective fruit.

Rinse Tests Suggested

Two methods of determining microbial population of surfaces are worthy of consideration:

1. Swab checks of stated areas of a surface.
2. Rinse tests of the entire surface.

The latter method is preferable in examining fruit, since it gives the opportunity of examining more fruit per sample, and it is easily adapted to the limitations of personnel, equipment and time. Also, exploratory studies have shown highly variable counts when the swab technic was employed, probably due to differences in pressure exerted on the swab, thoroughness in coverage, and the unevenness of the surface. Although the rinse technic does not determine total numbers, it does reveal uniform trends and allows the development of comparab'e data.

The fruit sample can be collected in a sterile paper bag and later transferred to the rinse medium. Or a suitable container (e.g., a ½ gal. wide mouth Mason jar) containing the rinse water may be taken to the sampling site. The sample should be thoroughly shaken for a standard time period before the rinsings are withdrawn for plating.

The plating results should be expressed on a unit basis, such as per square centimeter of fruit surface. It is obvious that such expressions as "total count per ml. rinse water" or "total count per fruit" are inadequate because of variations in fruit size.

Although simple displacement will serve to determine the surface area of most oranges, extreme differences in the length of polar and equatorial axes call for a more exact determination. An easy procedure is to caliper the polar and equatorial axes, and refer to Turrell's tables.[7] Total count can then be expressed on a basis of unit of surface area.

Provision should be made for the detection of organisms of public health significance (to be discussed in a later section), as well as those normally associated with citrus processing.

After storage, the fruit proceeds to the washing section of the process. Here again, rinse technics are of great value in determining the efficacy of the treatment. Detergent and germicide concentrations as well as process changes can be easily evaluated in this manner.

Chlorination—An All-Around Must

From a control standpoint, there is almost universal agreement within the industry on the value of high-level chlorination (beyond the "breakpoint") at this and other stages of the process. Excellent results have been reported with high pressure, highly chlorinated (50-100 ppm.) rinses. In a study on the washing of citrus fruits. Beisel *et al*[8] reported that maximum removal of microorganisms from fruit surfaces was obtained when (1) fairly constant concentrations of detergent were maintained, (2) there was employed a mixture of two detergents, one an alkyl aryl poly-ether sulfate type, and the other a phosphate, polyphosphate, free caustic and soda ash type.

They also reported that detergent concentration appeared to be of greater importance than control of total solids load.

After washing, recontamination of the fruit surface must be prevented. Here again, we find evidence of the utility of high-level chlorination. Fruit rinse sprays may be employed very close to the extraction area. Opinion differs on the distance, and the chlorine residual in the rinse water becomes a limiting factor. Some plants have reported safe usage of 50 ppm. within 20 ft. of the extractors.

Belts should be maintained under constant chlorinated water rinse conditions. Generally, the conveyors receiving clean fruit can be satisfactorily maintained with rinse water containing 5-15 ppm. chlorine.

All conveyor surfaces should be routinely checked by standard swab technics. Here once more, results shou'd be expressed on a basis of unit of surface area. A simple mask having a 1 in. x 4 in. opening is well suited for this purpose. Also, the diluting water employed in the lab

should contain an amount of thiosulfate adequate to neutralize the chlorine residual incident to this phase.

Rapid Handling Does It

Microbiological control from the point of juice extraction to the time of can closure depends to a large extent on the basic engineering of the process. Layout requirements should be directed toward rapid handling of juice at minimum process temperatures and retention periods. Valves, pumps, and fittings should be of sanitary design, capable of quick disassembly for cleaning.

Particular attention should be given to close coupling of valves in the line and the elimination of dead ends or pockets. Design of by-pass circuits can then be simplified so that valuable production time isn't lost in the cleaning of specific tanks or equipment.

Routine control of this phase should be based on results of intensive line surveys—these to be taken at periodic intervals, during the season, at known foci of contamination. There is much evidence that the process microflora will vary, both as to type and quantity, as the season progresses. Here again, we can utilize fruit surface contamination data as an index of potential plant conditions.

Clean-up programs will vary with each plant, in turn being based on trends revealed by line checks. Certain equipment must be thoroughly

(*Turn to page* 202)

How Technician Carries Out Rinse Test . . .

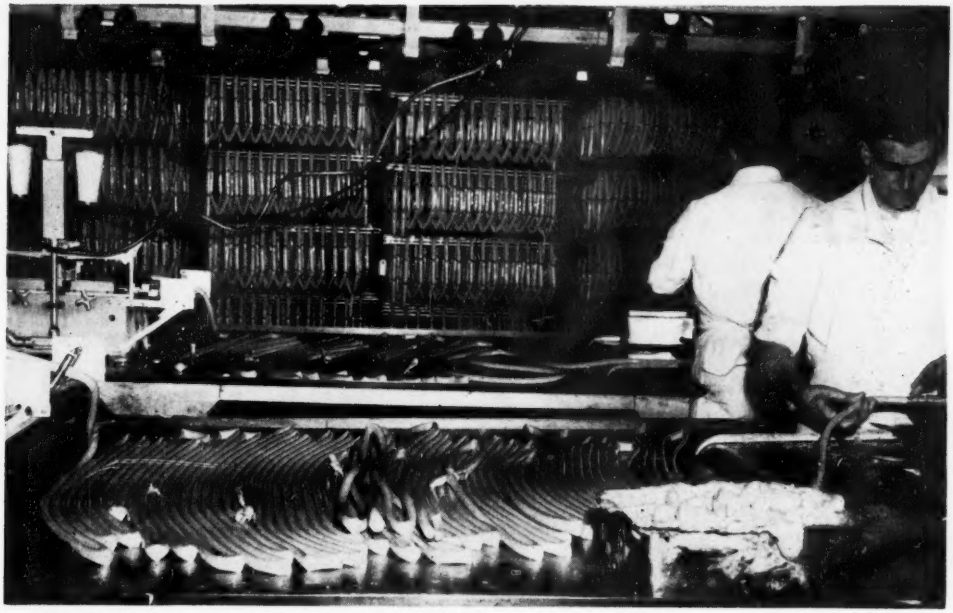
1 **FRUIT** are chosen at random from belt leading to spray washers. Tongs and bag are sterile.

2 **AFTER** being placed in jar containing rinse water, they are thoroughly shaken.

. . . To Measure Fruit-Surface Contamination

3 **RINSE WATER** is then plated to determine the microorganism count on the fruit surface.

4 **SURFACE** of each piece is gaged on slide-board so count may be expressed on unit basis.



SAUSAGE STUFFING at Deerfoot plant is carried out in specially designed, sanitary air-conditioned room where overhead tracking is at a minimum. Here, workers stuff frank meat into casings on stainless steel tables.

MODERNIZATION PUTS MONEY *In Your Pocket*

Five-fold increase in sausage-making capacity, simpler sanitation, and better working conditions are won at Deerfoot by advanced plant design, functional equipment layout, and direct-line material flow

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Granted, it takes a lot of space and a lot of equipment to move the many different meat products on schedule through the average multi-story packing plant. And to keep all areas and appurtenances clean demands considerable labor and expenses.

But a *practical* modernization program carried out with *engineering* logic will surmount such complications and have the operation working like a charm—and save money.

In the case of Deerfoot Farms Co., all the angles got the spotlight when the production planners attacked the problem at the Southboro, Mass., plant. And as finally adopted, the plan of action provided a fully modernized functional set-up specially engineered for more uniform output, greater efficiency, and better sanitation in processing the top-quality sausage products.

■ **The revamping of the plant and its operation has enabled this quality-conscious firm to increase its sausage-making capacity five-fold and to double its other meat-processing facilities.**

Today, movement of products is by the "straight-through" route—from the receiving platform, through the many processing steps, to the shipping department—with minimum amount of handling. And processing units have been carefully placed for higher operating performance, as well as more convenient and quicker cleaning.

"Straight-through movement was achieved by taking advantage of the fact that the basement-and-one-floor building was notched, step like, into the side of a hill. Materials are now received from a railroad siding at the basement level. Finished products are loaded on trucks at the street level. So the movement is horizontal across the basement, then vertical to the street floor above, and horizontal across that floor.

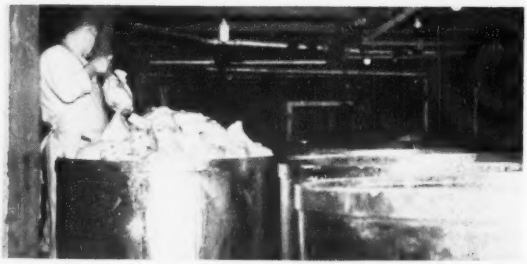
First step in the improvement program was in the building itself. Incorporated were new units and materials that effected structural economies while improving sanitation and working conditions.

How Plant is Laid Out

Floor space in the remodeled plant is allotted as follows:

BASEMENT: Accommodates Initial Processing

THIS 3-in-1 Roto-Cut unit quickly chops and mixes pork to make sausages.



SPECIAL stainless steel tierces are employed for curing hams bellies, butts, and daisies. These vats are easily cleaned.

FROM curing vats, meats are showered as they are conveyed from basement to first-floor processing area.

Basement floor—With only about one-third of the basement required for engine and boiler rooms, the remaining space is occupied by initial processing, storage, and equipment-washing areas. Initial processing— (1) sausage preparation and (2) curing and pickling—is carried out in two separate rooms. Between these rooms are four small enclosed sections where curing vats and other equipment are washed, and casings are cooled and flushed. Adjacent to the curing and pickling room is a cold storage room for hams, bellies, butts, and shoulders. Adjoining the sausage preparation room is a holding room for pork, veal, and beef.

First floor—Assigned space here are rooms for stuffing; bacon slicing and wrapping; sausage and frankfurter packaging; retorting; storing of spices, smokehouse apparatus, empty cans, and finished products; and shipping. Also, this floor has been enlarged to accommodate a large general office, private executive offices, inspector's office, and also lunch rooms, locker, toilet and shower facilities for about 230 employees.

Finished products are stored in five refrigerated rooms. All have doors faced with stainless steel. Stored at 48 deg. F. in a 30x50-ft. room are bologna, liverwurst, salami, pressed and minced hams, midget items, and the various meat loaves. Smoked hams, picnics, daisies, and shoulders are held at 28 deg. F. in a 30x40-ft. room. Bacon is chilled to 28 deg. F. in a 30x40-ft. room. Fresh sausages are kept at 26 deg. F. in a 20x50-ft. room. And all packaged and cased goods, ready for shipment, are stored in a 36-deg. F. 30x40-ft. cooler.

Carrier Corp. units heat, cool, dehumidify, and ventilate the sausage stuffing, packaging, and basement-processing rooms. These have finned coils through which steam is passed for heating and ammonia for cooling. Modulating thermostats control the valves in the steam-supply lines. And low-limit thermostats in the air ducts regulate the incoming flow of cold air.

A full-flooded ammonia system, tied into the main refrigerating unit with surge drums and float controls, supplies the refrigeration. Temperatures are controlled by thermostats that actuate solenoids regulating the ammonia feed.

A low-velocity duct system discharges draft-free air through Anemostats in ceiling outlets. Air is returned to these units through a plenum, located between the roof and the ceilings of the air-conditioned spaces.

All walls in the processing and packaging rooms are lined with glazed tile, and floors are surfaced with sanitary tile that is cemented with Drehmann acid-resistant mortar. Windows are glazed with glass blocks. Columns are attractively faced with stainless steel sheets. Exterior walls consist of 8-in. concrete blocks finished with 4-in. face bricks and stucco.

First-floor ceilings are insulated with 4-in. of Foamglas. Installed in the space between the roof and hung ceilings are wires, pipes, and air-conditioning ducts.

Big Accent on Product Handling

Next step in the modernization program was the provision of efficient, systematic flow of products through the plant.

Carload lots of selected meat cuts arrive on a railroad siding at the rear basement-level of the plant. Initial processing steps carried out in the basement are curing and pickling and the preparation of sausage meats for stuffing into casings.

Processed are more than 50 varieties of meats. Produced daily are thousands of pounds of frankfurters, sausages, hams, sliced bacon, meat loaves, and other pork products.

Hams, bellies, shoulders, and daisies are cured in special stainless steel tierces primarily designed for sanitary purposes. These smooth-surfaced vats are easier to clean than the former wooden units, and they last longer.

Cured meats are trimmed and then carried to the first floor by an inclined flight conveyor to be branded,

FIRST FLOOR: Final Operations

COMPANY'S popular sausages are hand-linked on stainless tables. They then go to chill room on aluminum rack trucks.

STUFFING UNIT (left) forces meats into parchment-paper lined metal molds. Resulting loaves are either baked or boiled.

MEATS are smoked in one-story thermostatically controlled houses.

stockinetted, and hung on trees for smoking. This conveying of the cured meats eliminates the former unsatisfactory batch movement by freight elevator. Too much time was lost in moving the meats by the old method and in washing the trucks employed. What's more, the old truck traffic created considerable congestion in the first-floor processing area.

3-in-1 Machine

Three operations are carried out in the basement sausage-preparation room. Fresh hams for making ham loaves are boned on a stainless steel cutting table. A Roto-Cut machine prepares the meat for fresh sausages. And silent cutters blend ground meats and spices for the other sausage-meat products.

The Roto-Cut, a three-in-one machine, feeds, cuts and mixes the product at the same time. On the charging end of the machine, the meat is loaded into a trough with a conveyor-bottom that is mounted horizontally on an indicating scale. After 200-lb. batches of meat are weighed into the trough, the pushbutton-operated charging mechanism is elevated. Another pushbutton is pressed to start the rubber-belt conveyor, which then feeds the meat into the rotating, open-end cutting drum. Spices then are added.

Rims on the turning drum prevent material from flying out while it speeds at 100 rpm. Inside, 20 curved knife blades chop and mix the material. The knives move in the same direction as the drum at 2,500 rpm.

Meat and spices are mixed, then emptied into stainless steel trucks. While the machine is running, another batch of meat, already weighed out, is fed into the drum.

In the 600 and 800-lb.-capacity silent cutters there are prepared the meat and spice mixes for bolognas, frankfurters, liverwurst, and other sausage products. All meats going into the silent cutters are first comminuted in a motor-driven, extrusion-type grinder. Snow-ice, used to chill the meats in the silent cutters, is prepared in a Vilter Mfg. Co. ice-making machine at the rate of 6 tons per day.

Movement of truck loads of sausage meat to the air-conditioned manufacturing room is by freight elevator. And flow of stuffed goods is in two directions. First, linked sausages are placed in company-designed aluminum stick-carrying trucks that are transported to a 26-deg. F. chill room and then to the packaging department. Second, frankfurts and other sausage products travel via overhead rail cages into the smokehouse, cooking compartments, and showers.

Multi-Product Stuffing

There are seven 500-lb. capacity stuffers for extruding sausage products into casings. Two stuffers are used for skinless frankfurters, an operation where the meat is put into artificial casings. And three automatic units are employed for linking the skinless frankfurters.

Two stuffing units are used for regular frankfurts. There are two tables, with 12 workers at each, where the regular frankfurts are linked by hand.

Every noon, after the frankfurter operations have been completed, the stuffing units are thoroughly washed and then used for making the Deerfoot sausage products.

To make the loaf goods, one stuffer fills meats into 5-lb.-capacity stainless molds that are parchment-paper lined. The parchment is used to prevent the cooked or baked meat loaves from sticking to the pans. All remaining stuffers are used for heavy sausage

See It Yourself

Readers of *Food Engineering* are cordially invited by President Albert Lewis of Deerfoot Farms Co. "to drop into our Southboro, Mass., plant and see" the modernized meat-processing operation described in this article.

ON FRANKFURTER LINE, casings are stripped from skinless franks, which are then weighed, placed on cardboard flats, and overwrapped with cellophane.

FRESH SAUSAGES are weighed and carton-packed in air-conditioned room.

products like bolognas and liverwurst.

There are five Atmos smokehouses with full smoke-generating and conditioning facilities. Here, temperature, humidity, and the density of the smoke are closely controlled. Temperatures are kept in the 110-200 deg. F. range, and the relative humidity can be controlled to 90 percent.

Meat loaves are trucked from the stuffing room to the processing area, where the loaves are either baked in a traveling tray oven equipped with a temperature controller or are boiled in 400-lb.-capacity stainless steel cooking vats.

Baked loaves are cooled on racks, while boiled loaves go into a stainless steel cooling vat, equipped with ammonia-refrigerated coils.

Speedy Bacon Wrapping

The bacon operation is carried on in the large, air-conditioned manufacturing room. A high-speed hydromatic Allbright-Nell machine, with a revolving knife, cuts squared slabs of bacon into 800 slices per minute. Emerging from this machine, sets of shingled slices are placed on parchment paper in approximately 1 or ½ lb. lots. A stainless steel band conveyor then carries these lots to the girls, who weigh and pack them into cellophane-lined wallet-type cartons.

Packaging of sausage products was formerly carried out in one room. Now, packaging operations are conducted in two areas—the fresh sausage room and the frankfurter chill room.

Linked fresh sausages are packed on a stainless steel table which is supplied with the product by a rubber-belt conveyor. Another belt, directly above, feeds in the empty waxed cartons. The sausages are weighed, passed on for wrapping in parchment paper, then packing into cartons.

All frankfurters are packed in a chill room. Skinless franks go on a stainless steel table for stripping off of the artificial casings, and the skinned wieners are then placed in 30-lb.-capacity stainless steel pans. The pans are carried by a rubber-belt conveyor to the table where the frankfurts are sealed and then packaged into whatever units are desired—1-lb. cartons or ½-lb. or 1-lb. cellophane-wrapped packages.

Hobby Turns Into Big Business

Back in 1847, Joseph Burnett, a manufacturer of vanilla extract and importer of spices, wanted a hobby. So he purchased several hundreds acres of rolling fields and woodland in the little town of Southboro, Mass., to set up a model farm.

Finds a Name. **In a small brook running near the homestead, Burnett found a stone bearing the hoof-print of a deer. And this gave birth to the name of his farm—Deerfoot.**

Makes Tasty Sausages. **Burnett started a model dairy business, but also experimented with other farm products—particularly sausages. He especially liked to send sausage meat to his city friends to show them the excellent quality of the real, home-made product.**

Plant Built. **Before long, Deerfoot Farm sausages became so popular that Burnett and his sons, Edward and Robert, went into commercial production. A plant was built in the heart of Southboro. Here a limited line of meat products was manufactured, with sausage the principal item.**

Dairy Firm Takes Over. **Deerfoot Farms was sold in 1929 to National Dairy Products Corp. And the Deerfoot products continued to be produced according to the same high quality standards originally established by the Burnett family.**

Operations Expanded. **Under Albert Lewis' supervision—first as general manager, later as president—the plant was remodeled, the latest equipment was installed, and facilities were increased to produce a more extensive line of meat products. The canning line was also revised to step-up production.**

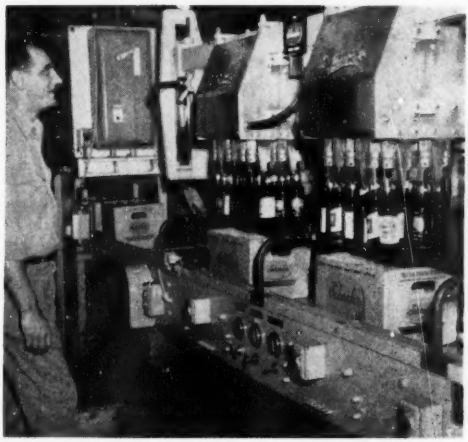
Wins Awards. **The company produced millions of pounds of processed meats for the armed forces during World War II.**

In recognition of its efforts, the firm won the Achievement A and Second Star awards.

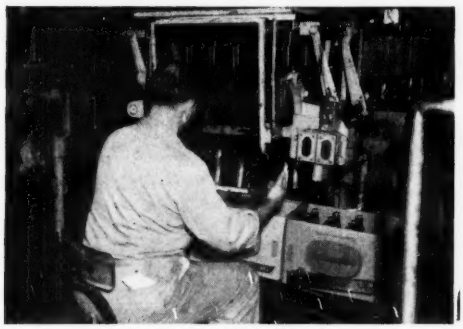
Postwar Modernization. **After the war years, the company underwent a complete reconstruction program and, today, it has one of the most modern and sanitary plants in the country—a plant that is a special credit to the meat-processing industry. This firm not only produces the quality Deerfoot Farm sausages, but also a complete line of other sausage products, smoked meats, and ready-to-eat items.**

Takes Them Out, Puts Them In With New High Performance ↓

Formerly several workers were needed to manually remove bottles from cases and place them on soaker feed.



TODAY, UNLOADER (→) does the job. Single operator merely observes its action and checks condition of cases.



Previously loader operator had to tediously position cases, trip bottle release, and move filled cases away.

TODAY, NEW CASER (→) performs these steps automatically, and attendant need only supervise.

Two "Robot" Units Spur Brewer's Bottling Operation

Schaefer's new automatics—case unloader and packer—accelerate line production, reduce glass hazards, promote employee morale

FE STAFF

A notable increase in operating efficiency has resulted from the installation of two new machines—a case unloader and case packer—in one of the bottling lines at the F. & M. Schaefer brewery in Brooklyn, N. Y.

Incorporating advanced engineering features, both units work automatically.

The new case unloader speedily and efficiently removes empty bottles from paperboard containers and deposits them on the infeed table of a 28-wide Dumore soaker-washer. Developed by the Geo. J. Meyer Mfg. Co., the unloader is driven directly from the washer. This eliminates need for additional motors and for complex timing mechanisms.

The unloader is comprised of two separate, but carefully synchronized,

(*Turn to page* 150)

Initial filling is under vacuum . . .

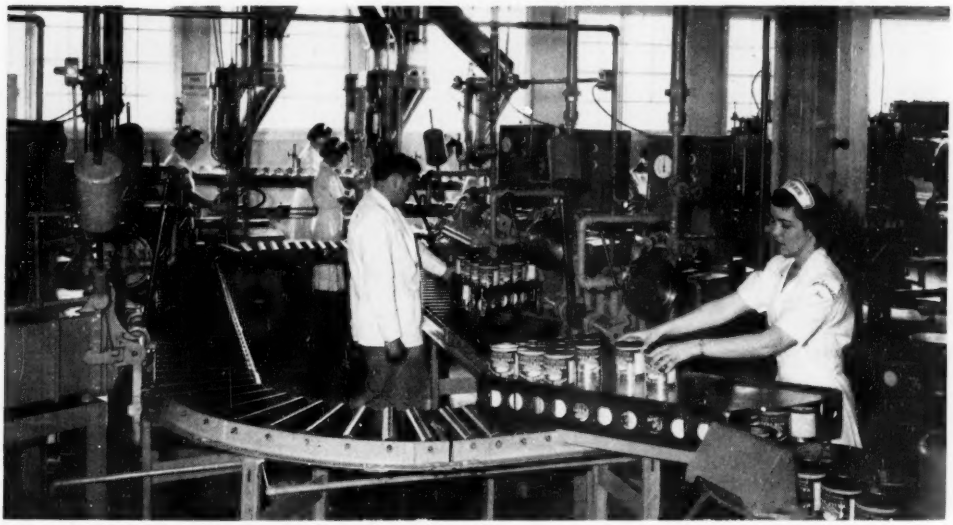
4 **FIRST VACUUMIZING.** Cans receive measured quantities of air-free powder from vacuum fillers (rear), then are conveyed to capping machines (left) where lids are lightly crimped. Frequent check-weighings insure uniform fill.

2&3 **DUMPING AND BLENDING.** Drums are unloaded by plant-designed hoisting and dumping rig, top edge of drum being rubber-sealed to exclude extraneous matter. Products are blended (adjoining picture) in rotating mixer that discharges into filler feed hoppers.

1 **BULK STORAGE** of all dried-milk products is in steel drums. Air is removed through petcocks in lids, thus retarding oxidation of contents between the time they are processed until packaged for shipment.

Five Highlights Of the Process

. . . then cans are re-vacuumized and gas-blanketed



5 **SECOND VACUUMIZING** and blanketing with inert gas (foreground) are performed in automatic cycling chambers. Cans are then unloaded from trays—with emphasis on gentle handling to avoid air infiltration.

"O_2 Below 0.2" System Guards Quality *Status Quo*

How Midwest dairy double-vacuumizes, blankets with inert gas—to foil oxidation in its canned dried-milk products. Process is keyed to stop if oxygen hits 2/10%

J. L. BECKER and ROGER BECKER

Plant Manager and Plant Superintendent, respectively, Maple Island, Inc., Stillwater, Minn.

Quality won through superior processing can rapidly dim during the gap between plant and palate. For, unless protected, nutritive value and taste appeal of many packaged foods simply toboggan with time.

And this factor grows more important each year, with regional food plants funneling their products out to far corners of the country, and the world.

Dry milk product manufacturers are particularly plagued by this problem of in-package deterioration—primarily due to oxidation. Acceptance and growth of many new milk products closely links to the use of packaging technics that will protect quality during transit and storage.

In our operation of Maple Island, Inc. (formerly Maple Island Farms, Inc.), at Stillwater, Minn., the need for special packaging was acute. In addition to national distribution, we had entered an export market where cans would lie unopened for at least several months. So a special dry-products canning plant was designed and built to efficiently carry out newly developed packaging methods and to achieve the highest safety of product during handling.

Six notable innovations mark the new system—

1. Storage of products for packaging in drums under vacuum

2. A specially designed contamination-proof feed-in method

3. Double vacuumizing for uniform, oxygen-free filling

4. Automatically controlled inert gassing of containers

5. A generator unit right in the plant to provide all inert gas

6. An integrated lab technic for detecting "leakers" and checking on oxygen

First, a brief word on the Maple Island products will open the way for our subsequent close-up of plant technics:

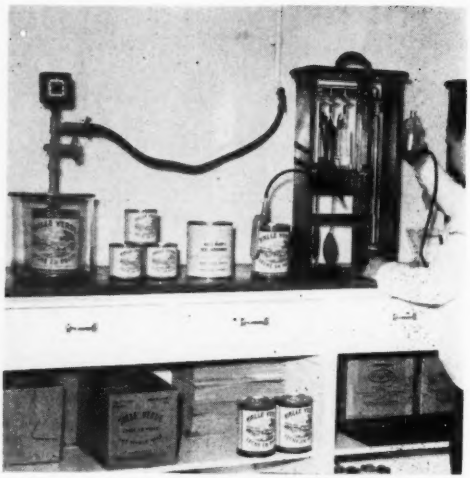
Powdered dairy products—both roller and spray dried—are processed in three creameries. These items include whole milk powder, ice cream and ice milk mix, non-fat dry milk solids, and a powdered chocolate drink. Also, a unique high-protein powder-form infant food—"MIF"—was recently introduced.

1—Roll of the Drums

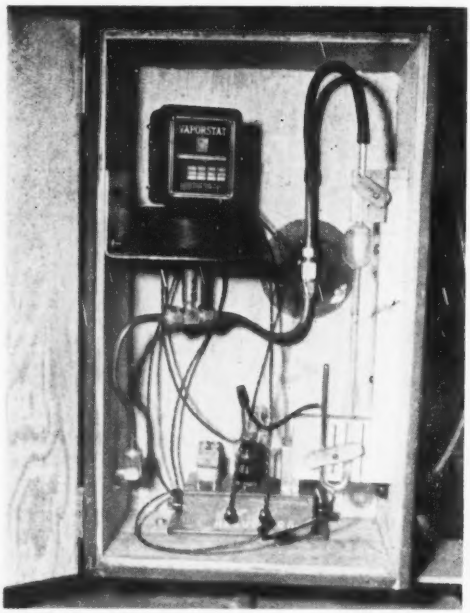
All powdered items, whether they're to go in consumer-size can or large fiber container, are filled into special steel drums immediately after the

Closing, Checking, Cycling, and Generating

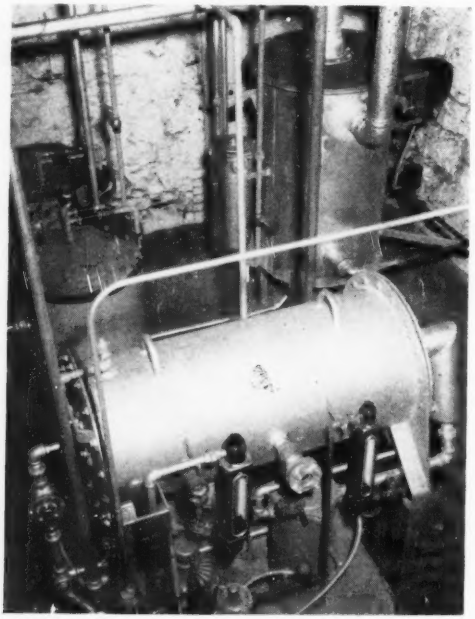
HERMETIC SEALING of filled, gas-blanketed cans (on seaming units, left) is followed by cartoning for shipping.



OXYGEN TESTS are made on Orsat apparatus (right). Vacuum submerging set (left) spots "leakers."



CONTROL of gas chamber cycle is by Vaporstat, plus company-built mercury-in-tube vacuum gage (right) and associated electronic relay (below).



GAS-MAKING equipment is compact. Generator is seen here in foreground, drying chamber at left-rear, trace-oxygen remover at right-rear.

drying operation. Each drum is equipped with a pressure-tight lid and a petcock that allows a vacuum of 29 in. Hg, to be drawn over the product. Literally hundreds of these vacuumized drums provide temporary low-oxygen storage until the product is packed.

2—Feed-In System

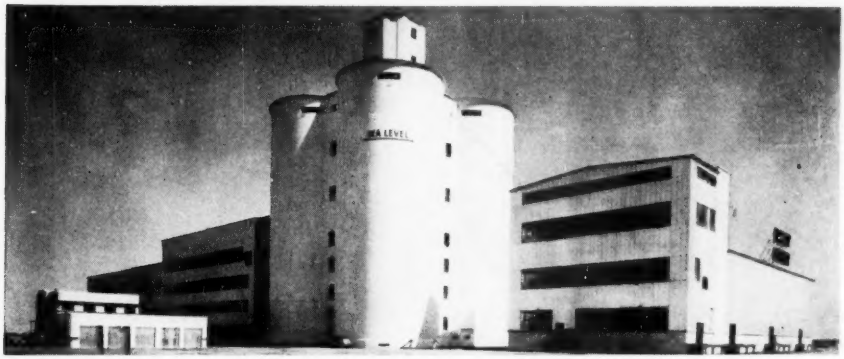
Filled drums are immediately transported to a storage area in the canning plant. Operations are meshed so that the product is filled in its final container within 24 min. after drying. However, a laboratory sampling check of each lot must precede the release of a batch of drums to the filling department.

Feed-in to fillers is handled in two ways.

Drums of non-formulated, low-fat product are simply conveyed by rollers to a motorized, hooded barrel-dumper

(*Turn to page* 143)

A SPECIAL FOOD ENGINEERING REPORT



MODERN Holly Sugar Corp. plant processes 3,600 tons of beets daily, with challenging efficiency.

TOP EFFICIENCY ATTAINED By 4-Point Advanced Engineering

Energy loss minimized, manpower reduced, and production boosted one-third over rated capacity by skilled teaming of these primary working elements—

1. ***Continuous*** **Unit Operations**
2. ***Efficient*** **Material Balance**
3. ***Economic*** **Energy Balance**
4. ***Automatic*** **Instrumentation**

J. E. BROWNING and C. R. HAVIGHORST

Respectively, District Superintendent, California Division, Holly Sugar Corp.; and Associate Editor, "Food Engineering"

Progressive food engineering ability and ingenuity are evidenced to the highest degree at "Carlton," Holly Sugar Corp.'s four-year-old beet sugar factory near Brawley, Calif.

Here, the company's design and construction engineers aimed at a three-point target—maximum capacity, greatest efficiency, and utmost economy in labor and sugar beet processing.

The imperative need for capacity and efficiency was not solely confined to the normal economies of beet sugar manufacture. For, being located well below sea level in the Imperial Valley, Carlton differs from the company's eleven other plants in the fact that its beet harvest season is crowded into a short 90-day period.

Predicated on available beet acreage, raw throughput at this plant was expected to run 250,000 tons of beets in this brief period. Speed was the factor, since temperatures in the Valley soar as high as 120 deg. F. and would deteriorate the beets if they were stored in piles, as is the practice in cooler climates. This condition dictated the

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New "Tell-All" Presentation

Here is a new "high" in detailing fundamental engineering information about an advanced food process. This special report, augmented by an expanded foldout flowsheet, goes far beyond conventional unit operations to include the three paramount engineering factors: Material Balance, Energy Balance, and Instrumentation.

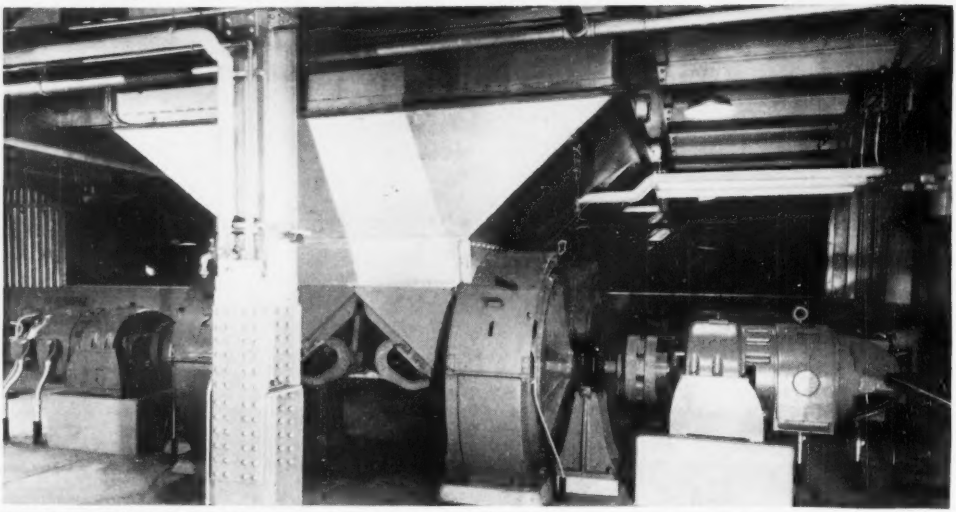
This "tell-all" study of an advanced process contains ideas of value to plant operating and technical men in all food branches. It will also interest executives who seek facts on their plant efficiency in respect to utilization of energy, continuous operations, and automatic control.

Prepared by Holly Sugar and FOOD ENGINEERING at considerable expenditure of time and effort, this "packaged" study is in two parts:

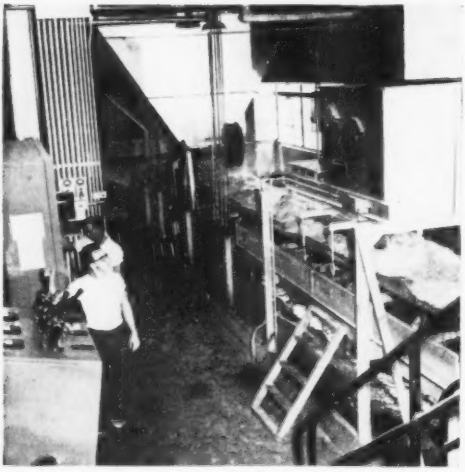
FIRST, THE REPORT (herewith): This is a step-by-step discussion revealing in detail how the fundamental engineering factors have been brought into play in the beet sugar process to achieve outstanding economies and efficiencies.

SECOND, THE FLOWSHEET (pages 122-126): This is a classical five-page graphic presentation of the complete process showing not only the equipment and flow, but the material and energy balances and the automatic controls which make the process possible. ***—The Editors***

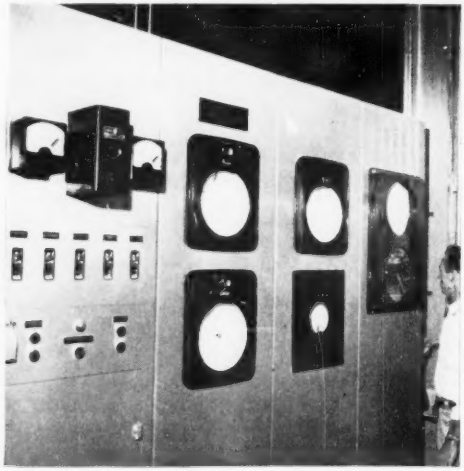
Beets are ground, weighed, and juice extracted



IN THESE GRINDERS, beets are cut into shreds resembling shoe string potatoes, and in this form are called "Cossettes".



COSSETTES travel on conveyor over automatic scale that weighs flow and apportions correct amount of water.



FROM THIS central control panel are regulated both temperature and water draft of 21-cell continuous diffuser.

need for very close coordination between harvesting and factory operations.

New Steam-Vapor Efficiency

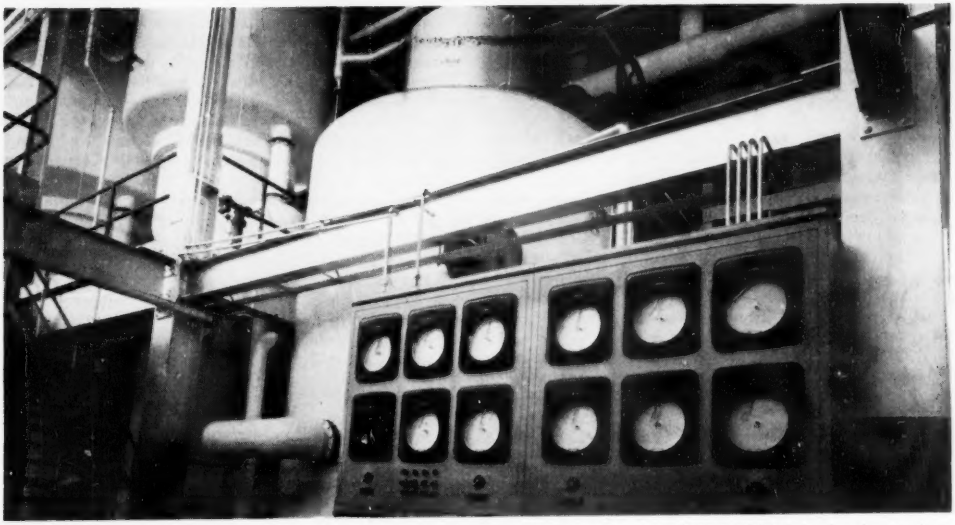
Carlton began processing in 1948 with output ranged at 800,000 lb. of sugar daily, based on rated capacity of 2,700 tons of beets per day. However, the past three years has seen an increase in capacity with development of a high, continuous operating rate that has materially reduced the amount of fuel used per unit of finished product. This latter economy is a result of coordination in steam and vapor use.

In short, the factory has more than lived up to its original specifications—its outstanding achievements having been largely accomplished by:

- **Initially installing the most modern, continuous-type equipment.**
- **Employing automatic instrumentation, wherever possible.**
- **Perfecting an efficient material balance.**
- **Adding refinements to the original economic energy balance.**

This progressive engineering program produced a striking pay-off; for during this 1951 campaign, just four years since the original shakedown operation, Carlton successfully processed beets at the rate of 3,600 tons per day—fully one-third above rated capacity.

Instrumentation, continuous and automatic machines and equipment have made possible a 35 percent reduction in man-power required as compared with a similar production



AUTOMATIC INSTRUMENTS control thin-juice flow, exhaust steam to evaporators, brix of thick-juice leaving system.

BENEATH the bases of the evaporators, a maze of valves and piping is required for the related steam and juice flow.

SUGAR is crystallized in these vacuum pans. Two in foreground are low-raw; next pair, high-raw; then white pans.

rate in a conventional beet sugar factory. And recent refinements improving upon the original efficient and highly economic heat balance now insure continued high capacity.

Flexible plus

Since completion of the plant in '48, only a few new units have been added to contribute to the handling and processing of the increased input of raw material. This bears out how the original engineering embodied an operating flexibility seldom found in other food plants.

Such flexibility was incorporated for two reasons: (1) The necessity of processing a fluctuating, but heavy, daily tonnage of beets immediately upon harvesting, and (2) the need for increased input when the beets' sugar content decreases during the season.

Sugar content varies from a high of 18 percent down to a low of 13.5 percent. The rapidly rising springtime temperatures in the Imperial Valley cause the majority of beets to ripen in May and June and to deteriorate rapidly after mid-July when temperatures reach their maximum.

The flexibility was attained when Holly engineers specified oversize equipment at critical processing and material handling points and designed into the system a highly efficient material balance and energy balance.

Since this report goes beyond the unit operations—complex in themselves—to offer a combined treatment covering material and energy balance, and also instrumentation, a step-by-step approach will be employed here to give utmost clarity to the engineering data.

The unit operations will be described in our first section,

followed by material balance in the second section, and energy balance in the third. The pertinent instrumentation —the fourth major component—will be noted throughout all three.

UNIT OPERATIONS

Beets are delivered to the factory by railway car and truck. Those arriving by rail are weighed, dumped into the wet-hopper, and pumped by a 5,000-gpm. beet pump to the flume feeding to the process.

Truck-loads are first weighed on 60-ft. platform scales, then are dumped into one of two hoppers that feed conveyors running to the temporary-storage sheds.

While daily receipts of beets vary, up to a maximum of 4,500 tons, capacity of the sheds is but 4,000 tons, only minimum storage space being required because harvesting and factory operations are closely coordinated.

Growers are paid on the basis of weight and sugar content of their beet deliveries. Accordingly, tests are made of representative samples from each load received.

Flume Flow Regulated

Tonnage of beets moving through the flume, either from wet-hopper or shed, is controlled by a rotating wheel having bars that extend into the flume to form a temporary "gate" against the beets. The water flows by and the rate of rotation of the wheel assures even distribution of beets in the stream, preventing choking of the flume or breaking the suction of the second 5,000-gpm. beet pump.

Two Dalton-type trash catchers pick up floating beet tops and other light, extraneous material. The second beet pump raises the beets hydraulically to the trash rolls, where remaining leaves and foreign matter are removed by high-pressure sprays and the turning action of the rollers.

Elevated to the upper part of the plant, the beets pass over a magnetic pulley that extracts any ferrous metal that may have remained in the flow. Then the beets are dumped into a hopper feeding the slicers.

There are four beet slicers, three varying in speed from 60 to 120 rpm., the fourth running at a constant 116 rpm. All are driven by 50-hp. gear-reducer motors. The battery operator manually coordinates the slicers to the desired rate of flow, in turn controlled by the requirements of the diffuser (which will be described later).

The sliced beets resemble uncooked "shoe-string" style potatoes. Called "cossettes", they are now chuted to the conveyor leading into the continuous diffuser. And enroute they pass over an automatic recording scale that measures their weight as they enter the diffuser. Simultaneously, this scale actuates an automatic proportional control which valves the correct gpm. of water to accompany this flow of beets into the unit. Water flows into the opposite end of the diffuser.

The ratio of weight of water to weight of beets entering is a major factor in extracting sugar from cossettes in an efficient and economical manner. Temperature of this water is regulated (to maintain it at 140 deg. F.) by the automatic addition of cool water to the tank.

Extraction Equipment Described

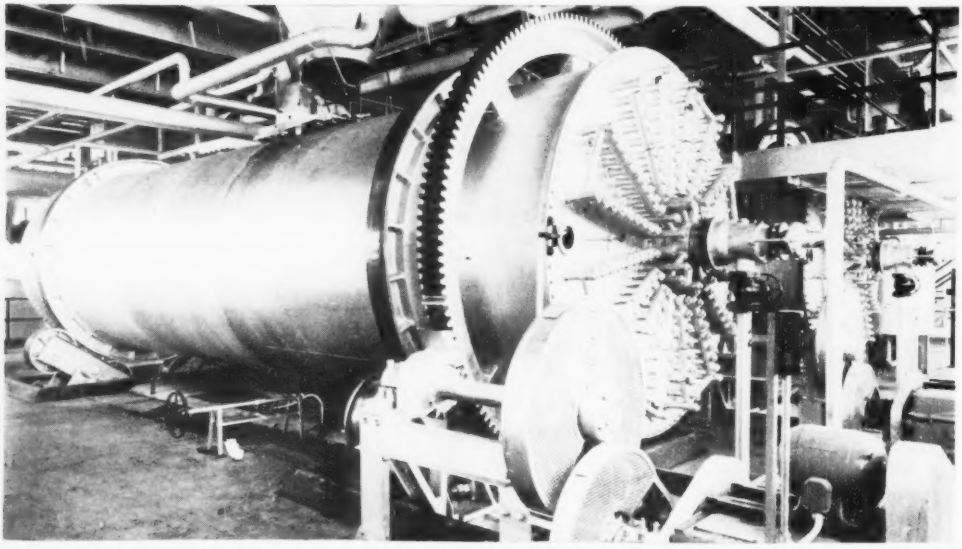
One of the first Silver continuous diffusion batteries to be installed in a sugar factory (there are now 16 such units in use in this industry), Carlton's 21-cell unit is 29½ ft. high, 77⅓ ft. long, and requires some 25 ft. for its width.

This continuous unit needs but one operator. If batch-type diffusion batteries were used, two would be required for a similar capacity, and manpower needed would be eight men. Thus, the continuous unit effects a saving of 21 men per three-shift day.

In the 21-cell Silver there is no pulp water loss, as compared to conventional type diffusers. By this elimination, the material balance loss is materially reduced and, due to finer automatic control, the water is reduced.

Constructed entirely of steel, the unit has cells in two banks, 9 in the upper and 12 in the lower. Cossettes enter the unit at Cell No. 1, water at No. 21. Moving the cossettes through the unit is a shelf-type conveyor made up of per-

Further crystallization . . .



IN THESE water-tube rotary units, sugar not yet crystallized out of low-raw syrup is removed from the massecuite. Temperature of massecuite is dropped slowly to maintain supersaturation during crystallization.

forated steel shelves carried between two heavy continuous chains. Driven by ten 3-hp. d.c. motors, the chains wind through the entire unit over axles centered at the apex of each upright and inverted curve of the U-cells.

Here, the d.c. current is developed by a motor-generator (M-G) unit, a 50-hp. ac. motor on plant power. The M-G system makes possible a 10-cycle range (60-70 cycles) for the variable speed of the diffuser chains. Speed is varied according to the slicing rate desired, throughput time being a factor in efficient diffusion.

How Unit Operates

The diffuser provides counter-current flow of juice and beets with concurrent flow through each of the U-shaped cells. Water supplied to the diffuser is somewhat purer than the fresh water supply to the plant because it contains large quantities of condensate. This is desirable in extracting the sugar from cossettes, for thus the quantity of non-sugar solids entering the process is reduced, resulting in increased purity of the effluent juice.

Diffuser water (140 deg. F.) introduced in Cell 21 mingles with the cossettes nearest to exhaustion of their sugar content. This water is transferred progressively from cell to cell. And in each cell it mixes with cossettes containing more sugar than the cell before.

The lower amount of sugar in the water (or dilute juice as it becomes) as compared with the amount remaining in the cell structure of the cossettes causes the sugar to diffuse from the cossettes into the juice.

Finally, the enriched juice reaches the No. 1 cell, mingles with cossettes being introduced, and is then drawn off at its maximum sugar content. It embodies, in addition, a considerable quantity of dissolved non-sugar solids which must be eliminated (as will be detailed presently).

The diffuser extracts about 98 percent of the sugar originally present in fresh beets in a throughput time of approximately 1 hr. 20 min. A uniform diffusing temperature of 70 deg. C. is maintained by automatic control instruments. This temperature aids in the process by lowering the viscosity of the juice, thereby increasing the rate of diffusion of sugar from the cossettes.

Exhausted beet pulp, removed from the unit by scroll conveyor following Cell 21, is conveyed to pulp dryers located in an adjacent building.

MATERIAL BALANCE

Starting with cossettes entering the diffuser as 100 percent of raw product, Holly carefully accounts the changing material balance during the process. And so that the reader may follow these figures as he continues through the description of operations, from raw beets to sugar, the specific running percentages will be noted in our text in parentheses. Moreover, the reader may also follow these percentages graphically on the foldout flowsheet (pages 122-126).

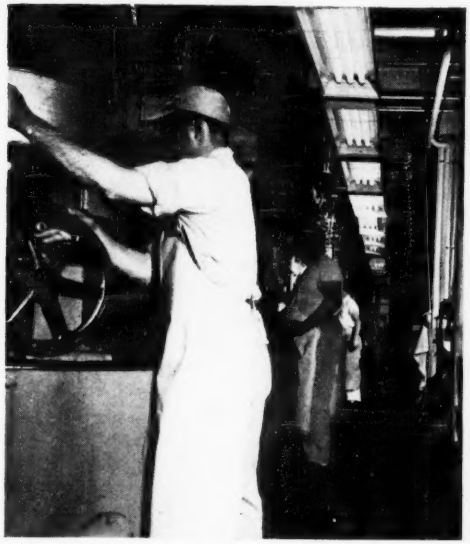
Raw-juice as it comes from the diffuser is of an opaque, grayish color, about 14 brix (55 deg. C.). Representing at this time material balance of 140 percent, it is pumped to the bumper tank. Here, excess Oliver filtrate (12 percent) is added brining the material balance figure to a total of 152 percent. The juice now is pumped to heaters, and its out-flowing temperature is automatically controlled at 85-90 deg. C. The temperature of raw-juice is important to the coagulation and flocculation rate in carbonation.

Because scale fouls them, tubes from these heaters are arranged so they may be withdrawn from service one at a time and cleaned by circulation of a caustic soda solution.

Treated With Milk-of-Lime

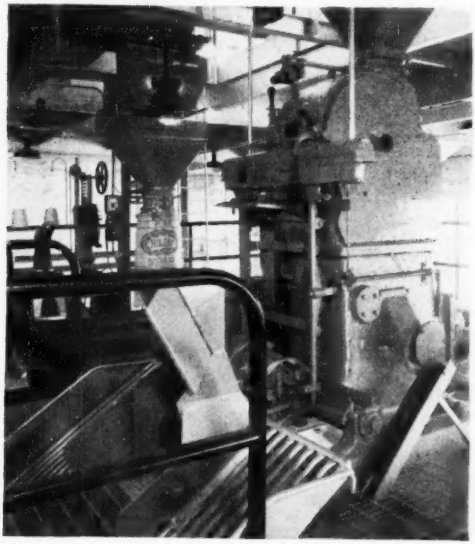
Heated raw-juice now is pumped to the first carbonating unit, where milk-of-lime is added to it in measured amounts. Raw-juice entering the carbonation tanks passes through a cycloidal meter. This unit powers a rotating bucket-wheel feeder which proportions the milk-of-lime into the raw-juice flow. Ratio of milk-of-lime to raw juice can be changed (to meet process requirements) by an intermediate variable drive between the meter and feeder.

. . . then centrifuging . . .



THIS BATTERY of high speed, basket-type centrifugals separates adhering mother liquor from the sugar crystals.

. . . finally bagging



UNIT seen at left is St. Regis valve bag packer. In background is Merrifield textile-bag filler and sewing head.

Carbon dioxide gas at 7 psi. is bubbled through this mixture from distributors located near the bottom of the unit. While carbonation is taking place, the mixture becomes viscous and foamy as colloidal impurities are precipitated with the insoluble calcium carbonate that is formed through inter-action of CO_2 gas and the milk-of-lime.

In this process, the reaction between the juice, milk-of-lime and gas is controlled according to results of titration of the residual dissolved alkalis in filtered samples of the carbonated juice leaving the process. Further, an automatic pH instrument initially indicates the trend toward over-or-under carbonation.

First Carbonation

In the initial carbonation step, raw juice goes into a large tank with a mixing section mounted around the outside. Here, the juice combines with the re-circulation flow before milk-of-lime is added. The gassing of this mixed juice and fresh lime takes place in the central tank. A quantity of finished juice equal in volume to the input (152 percent) is continuously drawn off and fed to a thickner.

In the precipitation of the calcium hydrate with CO_2 gas there are many additional complex reactions with the other non-sugar salts in solution in the raw beet juice. In addition there is a considerable range of change in the pH of the mixture at the various stages of mixing and gassing.

These pH changes pass through the range of the isoelectric points of the colloidal impurities, causing them to flocculate easily and settle with the precipitated inorganic salts. The point of maximum flocculation is called the "break" and corresponds to a specific residual alkalinity. It is this value that controls the process and the efficiency of the thickener in separating the solids from the finished juice. To aid in the formation of flocs, a pump recycles the limed juice at the rate of 5,500 gpm. Recirculation ratio is about 6 or 8 to 1.

The juice (174.52) leaving the thickener is the sum of the raw-juice, milk-of-lime, and gas introduced into the carbonation process.

pH Automatically Controlled

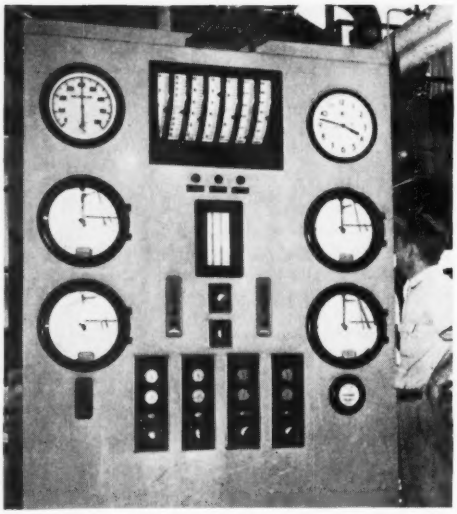
Clarified juice overflowing from the thickener is pumped first to a heater and brought to a temperature of 85 deg. C. Then it goes to the 2nd carbonation step, where the juice is circulated and gassed with additional CO_2 until maximum removal of precipitable lime salts is effected. This process is automatically controlled by the pH of the finished juice, the pH controller regulating the amount of gas introduced.

If, through deterioration of beets the juice becomes high in lime-salts, soda-ash is mixed with it in this unit to aid in their precipitation. Juice leaving this station is filtered through plate-and-frame filters, and the solids removed are combined with the under-flow mud of the Dorr thickener and sweetened off over Oliver filters.

The thickener underflow (30.5 percent) is pumped continuously from the bottom of the unit (usually at a brix of 35-40 deg.), and it provides a heavy, easily washed cake on the Oliver filters. These are continuous, rotary, vacuum filters of 8 ft. dia. x 12 ft. length. Covered with a cloth, these cylindrical filters rotate in and above an open tank of mud so that part of the filtering surface is submerged. The cylinder surface is divided into 24 segments connected through internal piping to high vacuum (15 in.), a low vacuum (5 in.), and compressed air.

Mud is picked up as cake by the high vacuum and, as the cylinder turns, it is washed by low vacuum. Compressed air loosens the cake from the cylinder and it is plowed off at a point just before the cylinder surface is again submerged in the tank.

Steam Generation



VIA CONTROL PANEL in boiler room, operator regulates generation of steam—150,000 lb./hr., 410 psi.

This discarded cake is diluted with water, pumped to a mud tank, then goes (8.95 percent) to the lime pond. Recovered juice—about 10 percent sugar—is pumped to the Oliver filtrate and wash receivers, the levels of which are automatically controlled.

Juices (21.55 and 8.95 percent respectively) from the filtrate and the wash receivers are pumped separately from these units. Part of the filtrate-juice (9.55 percent) is combined with the wash-juice (8.95 percent) and flows to the lime slacker as sweetwater to be used in the production of milk-of-lime from calcium oxide for the carbonation process.

Sweetwater is used, instead of common water, to minimize liquid which would have to be evaporated later in the process. Sweetwater flow is automatically controlled. The remainder of the filtrate juice flows to the raw-juice bumper tank or, optionally, to 2nd carbonation tanks.

Gas Bleaching

Leaving 2nd carbonation, the juice (144.02 percent), with pH automatically controlled, is again filtered and then pumped to the sulfur tower.

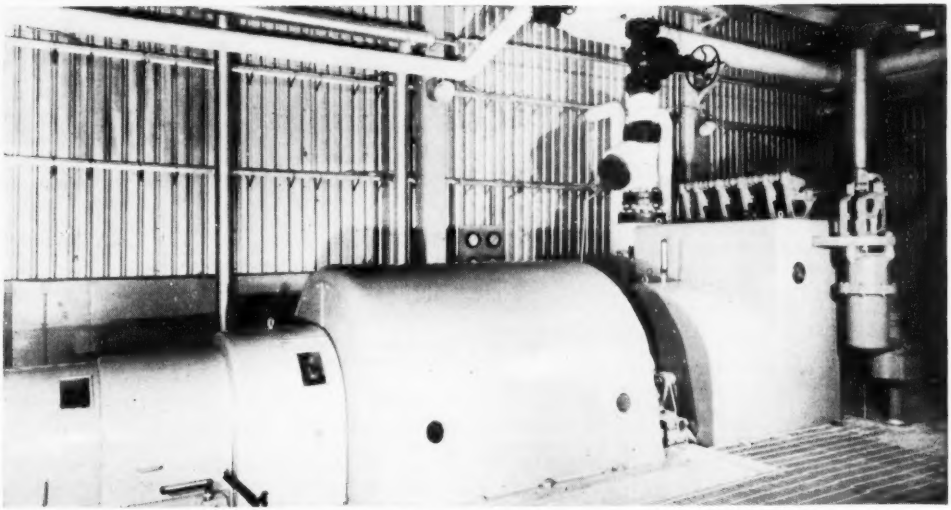
Sulfur dioxide gas is produced by burning lump sulfur in a rotary stove, and the gas is sent up the tower by a blower. Juice is pumped to the top of the tower and cascaded down the baffled interior against the rising gas. Raschig rings and tile baffles break up the stream and promote more complete SO_2 absorption. A pH instrument automatically controls the sulfitation by adjusting the amount of SO_2 gas introduced in the tower, which in turn regulates the pH of the juice. It is generally not reduced more than .2 pH by the addition of gas. This is sufficient to obtain the bleaching action and other beneficial effects.

The "thin-juice" coming from sulfitation is pumped to a boiler, heated to 98 deg. C., then flows to the evaporator supply tank. Temperature and level of the juice in the boiler are automatically controlled.

Evaporator Operation Is Prime Factor

The automatically controlled evaporators are of major importance because, in addition to evaporating thin-juice

Power Development



PLANT ELECTRICAL power (3,000 kw., 2,300 v.) is developed by this GE turbo-generator. Unit receives steam from boiler (410 psi., 575 deg. F.) and exhausts it (45 psi.) to evaporators for use in processing.

(144.02 percent) into thick-juice (29.5 percent), they are engineered so the vapors provide the heat for numerous other unit operations. They also are a source of pure condensed water for boiler feed and other purposes.

Juice (144.02 percent) from the evaporator supply tank is pumped to the thin-juice heaters. After heating, portions of this juice (4.23 percent) are used for melting sugar in the high-raw melter, and other portions (2.02 percent) for melting, it in the low-raw melter. Heated to 148 deg. C., this thin-juice flows to the No. 1 dual effect evaporator.

Set Comprised of Seven Evaporator Bodies

This quintuple effect evaporates 5 lb. of water from the juice per pound of steam used. In all, there are seven evaporator bodies in the set. Nos. 1 and 2 are dual effects, Nos. 3 and 4 are single, and No. 5 is a calandria-type effect. These are Swenson long-tube (2 in. o.d. pipe x 20 ft.) film-type evaporators. The steam enters at the side of each body and surrounds the tube bundle.

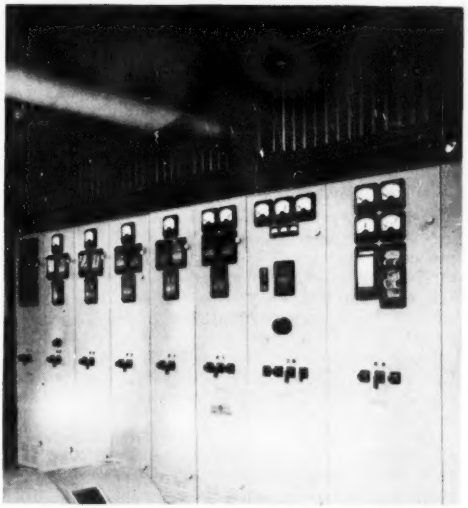
Thin juice enters at the bottom of the tubes, boils, and the steam bubbles up the tubes. Its velocity increases as it moves upward, and it finally forms a film in the upper tube sections. It is ejected at the top of the tube bundle, at a high velocity, against an umbrella-type baffle plate. This deflects the juice into a gutter around the upper tube plate, from which it flows to the next effect. Vapor circulates past this baffle, through a catch-all,—then goes to heat other unit operations.

Exhaust steam provides initial heat to the first effect. On condensing, this steam transfers its heat to the juice. Vapor from this boiling juice is collected in the evaporator dome and is piped to the vapor chest of the next effect and to other units.

Juice and Vapor Flow Are Parallel

Flow of juice to the No. 1 effect is split between the two bodies and automatically controlled. Constant levels in all effects are automatically maintained. The juice and vapor flow are parallel, with vapor finally going to the condenser from the 5th effect. Juice entering the first evaporator is about 13.4 deg. Brix and 90.0 purity.

Electrical Distribution



HEART of electrical control is this modern GE switchgear. Power from board runs plant's 300 motors.

Material balance through the components of this equipment is shown below:

Evaporator	Brix (Deg.)	Percent
1 (inlet)	13.4	137.77
1 (exit)	13.4	88.54
2 (exit)	13.4	55.20
3 (exit)	13.4	31.30
4 (exit)	13.4	30.40
5 (exit)	65	29.50

This process continues through the seven bodies until, from the 5th effect, vapor is piped to a condenser. The condenser keeps the last vapor at low pressure (under vacuum) and consequently at a low temperature. In a multiple effect evaporator such as this one, each evaporator acts as a condenser for the preceding effect. This results in each succeeding vapor pressure, also temperature, being proportionately lower, with lowest pressure and temperature in the final effect.

Thick Juice Goes to Two Units

The effluent, from which about 90 percent water has been evaporated, is now thick-juice (29.5 percent). It is separated (28.3 and 1.2 percent, respectively) and pumped to two units, the thick-juice blender and the low-raw melter.

Also introduced in this blender are wash-syrup (4.4 percent) from white centrifugals, and high-raw melted sugar (13.2 percent).

In the blender, these syrups (45.9 percent) are heated to about 96 deg. C. And because juice concentration has caused certain impurities to precipitate in finely divided form, this blended juice is filtered before it is pumped to the No. 1 standard liquor tank. Double filter cloths and a refined diatomaceous filter-aid are used, with the liquor pumped through two sets of plate and frame filters, to produce a standard liquor of especially high quality.

All storage tanks, lagged to prevent heat loss, have closed steam coils which heat the juice to automatically controlled temperatures. The juice is drawn into the pans by vacuum, no pump is used.

White Sugar Boiling

These vacuum pans have calandria heating sections, and vapors are drawn off with automatically operated water jet condensers. The white-pans are heated with vapor from the first effect evaporator, high-raw pans with vapor from the second effect, and low-raw pans with vapor from the third effect.

In this system, all concentration, up to and including the final production of the crystallized product, is done with steam initially used by the evaporators.

"Massecuite" Described

As in many processes, beet sugar boiling has a terminology that may need defining. "Massecuite" is the finished product of the pans. It consists of a mixture of sugar crystals and its surrounding syrup, called "mother liquor" (or, as in this text, No. 1 Green) after it is centrifuged. A "strike" is a batch or the product of one pan—the massecuite.

Sugar boiling is the first batch operation in this continuous flow. The operation of the pans must be closely coordinated with that of the production of thick juice from the evaporators.

The aim of sugar boiling is to produce uniform crystals of required size and the highest possible yield of sugar from the resulting massecuite. Crystallization is the most effective purifying part of the process. While diffusion and carbonation remove large quantities of impurities, the crystallization process produces 99.99-plus pure sugar from 93-94 purity massecuite.

At the start of a strike, the pan is closed and the vacuum brought up to 27 in. A quantity of standard liquor is drawn into the pan sufficient to cover the calandria. Steam (vapor from the evaporators) is throttled into the calandria and the juice begins to boil slowly. This is the graining charge.

As boiling continues, the juice becomes supersaturated. And, at a certain density, as dictated by the operator, the pan is "seeded" or "shocked"—that is, there are added small quantities of powdered sugar to form the grain. Crystal nuclei then form spontaneously, and through control of the supersaturation by vacuum, temperature, addition of syrup, and steam, the crystals are grown to desired size.

To evaluate the progress of boiling, the operator takes frequent samples of the massecuite from the pan with a proofstick. Through experience, he can thus judge its progress.

After seeding, the boiling is continued until sufficient grain has formed. The pan is then built-up by the addition of more standard liquor, also continued boiling, and is thus filled with massecuite. When full, boiling follows to a brix that will provide efficient operation of the centrifugals. When the massecuite is at the correct fluidity and consistency to flow into the centrifugals, the vacuum is broken and the massecuite (32.2 percent) discharged through a foot-valve into the white mixer.

The mixer is a "U"-shaped trough, at the bottom of which is a slowly rotating paddle shaft that keeps the massecuite in a fluid condition. A series of six manual air-operated gates and short spouts lets the massecuite into the centrifugals below the mixer.

Centrifuging

These are new type centrifugals, of 40-in. dia. by 30-in. depth with direct drive, fluid clutch, and powered by individual motors. Their capacity is 25 percent greater than that of earlier models, widely used by the industry. Thus, there is a corresponding increase in production, and also a reduction in the number of operators needed at this station.

The centrifugals are automatic-cycle units.—After manually setting the time for (1) acceleration, (2) purging, (3) washing, (4) drying and (5) braking, the machine operates through these five cycles automatically, then stops. The operators have only to fill the machines with massecuite at the beginning of a cycle and plow the sugar out of the basket at the end. Wet sugar discharges from the bottom of the units through a saw-plate valve and into a scroll conveyor.

How Machines Work

These units, rotating at 1,600 rpm., produce a separating force of approximately 1,500 times granting upon the mother liquor surrounding. Inner screens are of brass sheet, perforated 625 holes per square inch. Centrifugal force presses the massecuite against the screens and mother liquor is forced through the perforations and collected in a gutter. From the white centrifugals this is called No. 1 green-syrup. It is valved to its designated receiving tank, then subsequently pumped to the No. 1 green storage tank that supplies the high-raw pans.

While the centrifuge is charged and still rotating, hot water is sprayed on the wall of sugar and thus remaining traces of mother liquor are washed from the crystals. This syrup, called No. 1 wash, is collected in a receiving tank and later pumped to the thick-juice blender.

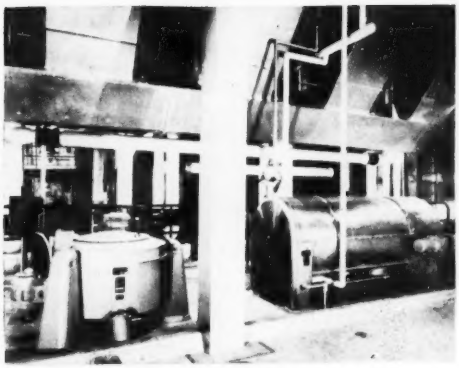
Wet, white sugar (13.56 percent) with a moisture content of about 1.0 percent, is conveyed at the rate of 510 lb. per min. by scroll and elevator to the wet sugar bin.

Screened and filtered air passes through a 13,000v. d.c. grid Precipitron by the granulator fan, and any minute dust or pollen particles remaining are filtered out by ionization. The purified air is then forced through the heating coils and continues into the body of the Rotolouvre dryer, or granulator, at an automatically controlled temperature. Outgoing temperature is automatically held 7 to 8 deg. C. lower than the incoming heated air flow.

A third instrument maintains a $\frac{1}{8}$-in. water negative pressure at the discharge end of the granulator to prevent fine dust from leaking out of the air system.

This is a relatively new type of granulator to be used in the beet sugar process. In it, air is forced through a

LIMESTONE AND COKE are supplied to kiln by this rocker-shovel. It is powered by a 3-hp. electric motor.



LAUNDRY equipment is employed to clean filter cloths from the many plate-and-frame presses used in process.

bed of sugar instead of the sugar being moved through air, as in most conventional granulators. The advantage credited to this unit is that it preserves the luster of the sugar because of less crystal-against-crystal abrasion.

From the granulator, sugar at the rate of 505 lb. per min., is elevated, screened and automatically weighed in 100-lb. lots. It is next dumped into a scroll and then elevated to one of the bulk bins in the silos.

The four concrete silos are of 50 ft. dia. and 106 ft. high, and each has a capacity of 10,000,000 lb. of sugar. Air, dried by a calcium chloride dehumidifier, is circulated in the silos to maintain a low relative humidity inside the bins.

Above the packaging station, two screening units make available any crystal-size separation required by customers. Mechanical equipment packages both 100-lb. textile or paper valve-bags, also 5, 10, and 25 lb. lots of sugar in paper or textile.

High Raw Boiling

Two syrups are produced by the white centrifugals: No. 1 green and No. 1 wash. The latter, being of about the same purity as white massecuite, is returned to the blender. The No. 1 green still contains over half the potentially recoverable sugar and is subsequently subjected to two more intermediate boilings.

These latter boilings produce a syrup from which a new, raw sugar is obtained which is then remelted and pumped back to the thick juice blender and then goes to the white pans. Boiling is similar to that in the white pans, however, the time is longer due to the slower crystallization entailed by the lower purity syrups.

The first intermediate boiling is the high-raw. Syrups (15.2 percent) from No. 1 green tank, and also those (9.5 percent) from the low-raw melter and the No. 2 wash (5.4 percent) are combined (30.1 percent) and drawn into the high-raw pans.

High-raw massecuite (26.2 per cent) is discharged from these pans into a mixer and thence into centrifugals. The time cycle of these four units is slower, usually 4-5 min., compared to the 2½ min. of the white centrifugals. Volume of wash water used is less, too—about 6-8 qt. compared to as many as 16-20 qt. in the white wash.

Less wash water is used because it is not necessary to have this sugar as free of mother liquor as the finished white sugar product. Excessive washing dissolves crystallized sugar and increases the purity of run-off syrups—thereby increasing the difficulty and cost of recovery.

From the centrifugals, the high raw sugar (8.8 percent) drops into a scroll which conveys it to the melter. Now added is thin juice (4.23 percent), pumped from the evaporator supply tank. The melter, fuses (98 deg. C.) the high raw (96-98 purity) sugar and thin juice. There is an addition of condensate (.17 percent) to the high-raw syrup from the heating coils (8.8 plus 4.23 plus .17 equals 13.2 percent), and this mixture is pumped to the blender and then becomes white pan material.

The No. 2 green syrup, that portion (12.5 percent) extracted by centrifuging the high raw sugar, flows to the receiving tank and is subsequently pumped to No. 2 green tank supplying the low-raw pans.

Low Raw Boiling

Important part of this process is the low raw boiling, because the amount of loss, in the form of molasses, is determined by how efficiently this massecuite is boiled, aged, and centrifuged.

Boiling of this massecuite is in a calendria pan heated by low pressure vapors from the No. 3 evaporator. The time is quite long (usually about 8 hr.) because of the low rate of crystallization due to the viscosity of the syrup at the lower purity of 75.0 to 77.0.

This pan is operated in much the same manner as white and high raw pans. A graining charge is concentrated in the pan until it is supersaturated and then seeded by introduction of a measured amount of powdered sugar. Grain is allowed to form until enough is present to form crystal nuclei for the entire pan. Further formation of crystals is stopped by reducing the supersaturation by adding additional syrup. Content of the pan is slowly increased by the addition of more syrup. Supersaturation is controlled at a point where it permits growth of the massecuite but not new crystal formation.

When the pan is full and the density of the massecuite (11.2 percent) gets very high it is then discharged into the two rotary crystallizers, where it remains for about 7-8 hr.

This massecuite is so viscous that only a part of the ultimate crystallization occurs in the pans. Its density retards the rate with which the mother liquor builds up on the crystals.

The supersaturation and density of the massecuite is high at the time it is dropped from the pan into the crystallizers. As it cools, small quantities of water are added to reduce the viscosity and to promote crystallization. The temperature decrease of the massecuite is automatically controlled by the amount of water flowing through the crystallizer tubes.

The following massecuite temperatures are typical: Entering unit, 83 deg. C.; at end of cooling cycle, 38-40 deg. C.; and in centrifugals, 52-55 deg. C.

This massecuite is heated prior to centrifuging to reduce its viscosity and facilitate better separation of this heavy material by the centrifugals. It may be reheated, thus, as high as 55 deg. C. before sugar begins to dissolve from the crystals back into the mother-liquor.

An 8-10 min. centrifuging cycle, compared to the shorter time-cycle for white and high raw, is required for low raw sugar. In order to obtain the lowest possible purity of final molasses, no wash water is employed.

The low raw sugar (6.12 percent) is scrolled to the melter, where thin-juice (1.2 percent) is added (total 9.5 percent). After melting, this syrup is pumped to the pan storage tanks to become a part of the feed to the high raw pans.

The molasses (5.47 percent) after being weighed is pumped to storage tanks. Much of it is used in the production of molasses dried-beet pulp used for cattle feed.

ENERGY BALANCE

Because the manufacture of beet sugar requires large amounts of steam to evaporate large quantities of water, every dollar's worth of fuel must be efficiently used. Carlton is the first beet sugar factory to employ only one steam generator for this purpose—most other plants having two or more. This unit burns about 4,000,000 cu. ft. natural gas per 24-hr. working day. Heat loss is by radiation only and is approximately 5-10 percent of the total.

Steam is generated at 410 psi, 575 deg. F., in this high-pressure unit, rated at 150,000 lb. of steam per hr. when continuously operating, or 180,000 lb. per hr. for 4-hr. periods. Use of high pressure steam is confined to the boiler house, where it drives a 3,000 kw. turbogenerator, an Elliott blower, and the boiler feed pumps. At a slicing rate of 2,700 tons of beets per day, steam requirements average 133,500 lb. per hr.

All steam and hot water lines are heavily lagged to reduce radiation loss. This also aids in keeping factory temperatures down.

Stack gasses go through large ducts to the two gas-fired furnaces used for beet-pulp drying, effecting a fuel saving of approximately 25 percent in these units.

The turbo-generator develops power at 2,300v. for the 300 motors, fractional up to 250 hp., used in the plant. It has sufficient reserve capacity for future motor installations. There are four power feeder circuits feeding four power centers. Each center has a 1,200 kva. air-cooled transformer to reduce voltage from 2,300 to 460. Fourteen sub-feeder distribution panels complete the electrical system.

The Elliott blower draws CO_2 gas from the lime kiln and feeds it at 5,500 cfm. to the carbonation units. Water from the first evaporator flash tank, at 45 psi., 292 deg. F., is pumped directly to the boiler by the turbine-driven main boiler feed pump, and make-up, as required, is supplied from the boiler feed tank, at 212 deg. F., by a second turbine-driven feed pump.

These units exhaust 94,900 lb. steam per hour at 45 psi., 292 deg. F., supplemented by about 38,600 lb. per hour of 100 psi. steam which makes up the process requirements of 133,500 lb. per hour, 45 psi., 292 deg. F. steam.

Carlton's unusually efficient and economical energy balance is centered in its steam utilization. With the few exceptions noted below all boiler-room exhaust steam is used initially in the first evaporator effect. Steam flow into this unit is automatically controlled. It exhausts from this unit to a flash tank, then goes to the main boiler feed pump and is returned to the boiler.

The only units in the process deriving heat (steam) from a source other than the No. 1 evaporator effect are the beet slicers, which require 2,500 lb. per hour, 100 psi. steam to the knife-cleaning nozzles; and the LaFeuille crystallizers for reheating. This steam is also used for cleaning out pans, mixers, and other units.

Generated in this first effect from juice, vapor (material balance 37.34 percent) flows to the No. 2 effect to become the heating medium for this body. This process continues through the seven bodies until, from the fifth effect, vapor (.90 percent) is piped to the condenser. Pressure in this final body is automatically controlled by the amount of water supplied to the water-jet condenser.

Condensate from effects 2, 3 and 4 is piped to flash traps Nos. 1, 2 and 3 and thence to the boiler feed tank. Condensate from effect 5 is piped to the press wash tank. Vapor pressures in the effects:

Effect No.	Vapor Pressure
1	32 psig.
2	20 psig.
3	9 psig.
4	2 psig.
5	25 in. Hg.

A recent refinement at the evaporators brings stabilization of pressure in the first three effects, and simultaneously guarantees a constant supply of steam to the other processing equipment drawing on these units for heat.

Formerly, under peak loads, the steam demands of these other processing units increased to a point where uniform pressure in the evaporators was endangered. To eliminate this possibility, a line was taken from the boiler exhaust header and connected to the vapor line of the first effect. Two other lines were taken from the No. 1 vapor line, one goes to the line of No. 2 effect and the other to No. 3.

An automatic pressure controller, attached to the line leading to No. 1 effect, now adds exhaust steam to this vapor whenever pressure make-up is required. Two other controllers add first vapor to the second vapor, or first vapor to the third vapor, if there is a pressure drop in these bodies.

Throughout the process, wide use is made of automatic instruments to control temperatures, pressures, flow (of steam, and also product), brix, pH, and the level of juice of syrups.

Condensate from all units is pumped to one of three receiving tanks—the boiler feed, press wash, or battery supply—tanks.

Water System

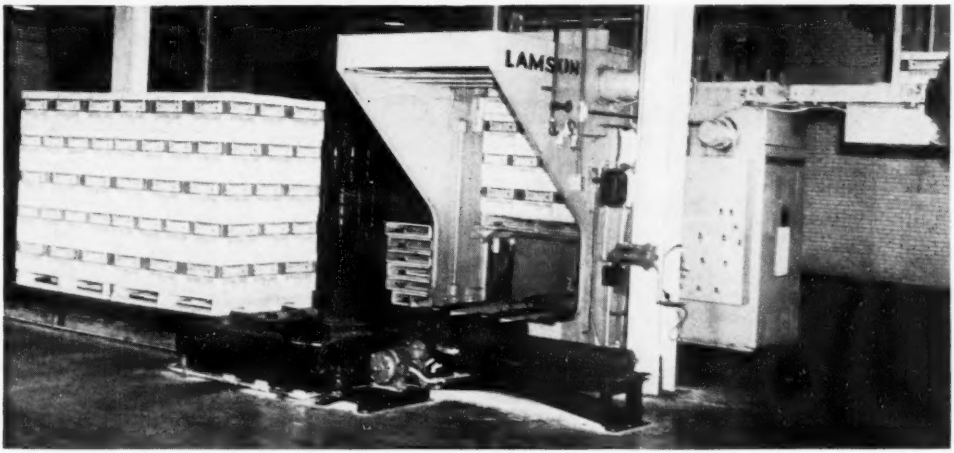
The All-American Canal, used largely for irrigation purposes in this garden spot in the center of the arid Imperial Valley, is the source of 1,000 gpm. of water used in this plant. It is introduced into the cold well of the cooling tower as make-up and becomes part of the 5,500 gpm. pumped to the plant.

Most of the condenser water (3,540 gpm., 121 deg. F.) from the evaporators and vacuum pans is first collected in one of the two seal tanks, then pumped over the cooling tower and re-used. The circulating pit, source of beet-flume water, receives 1,000 gpm. of water from seal tank No. 2. And except for approximately 20 percent discard, all beet flume water is re-used.

Because the plant waste water is sometimes re-used for irrigation purposes, complete treatment of it is required. It is first piped to a primary sludge collector, then goes through a system of six lagoons. These are 4½ ft. deep, 250 ft. wide, and 2,640 ft. long. Parshall flumes meter the water into the lagoons and later carry the completely oxidized water out of them into the Valley drainage system.

Because of extremely high ambient temperatures, the plant is air-cooled and ventilated for the workers' comfort. Six water-washed air units circulate 330,000 cfm. of cooled air through the plant.

NEW EQUIPMENT & SUPPLIES



Automatically Stores Mechanically Loaded Pallets

A new assembly, comprising a special robot-handler hooked up with a pallet loader, provides automatic intermediate storage of pallets.

New arrangement makes it possible to accumulate up to six loaded pallets while waiting for a truck to return from the stacking area. Thus, automatic operations in loading can continue without delay in the event the truck does not return in time to remove the loaded pallets as they are discharged from the palletizer.

With the new layout, filled pallets are pushed off the loader's discharge conveyor onto a second conveyor at right angles to discharge. Automatic tripping mechanisms operate a ram which pushes the loaded pallet onto the right-angle mover. Illustration shows incoming case (extreme right), partially filled pallet in loader (center), and two finished pallets on right-angle storage conveyor, (left).

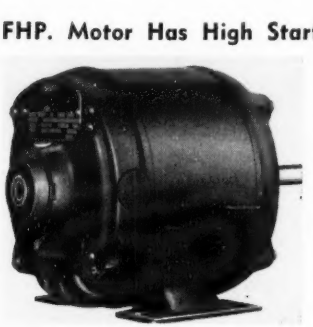
Such storage is particularly useful when alternate pallets are loaded with different commodities. Trucks may now take these commodities to stacking zones at various distances from the loader without interrupting the schedule of the loader or truck. Otherwise, on long hauls the loader might be delayed, while on the short haul the truck might have to wait.

Pallet loader itself eliminates manual loading in mass production operations. Cartons or cases are conveyed to the top of loader, where electro-mechanical devices position alternate containers for best pal'et arrangement.

When more than one size container is in production, the machine automatically positions intermediate predetermined pallet lots so that each is stacked properly on its pallet. A magazine within the loader automatically supplies pallets.—*Lamson Corp., Syracuse, N. Y.*

Circle 103A on Reader Service Card

FHP. Motor Has High Starting Torque



This new "Special Service" split-phase, fractional horsepower motor has a high starting torque for use where high starting current is not objectionable. Breakdown torque is in accordance with NEMA standard for the basis of rating. Service factor is 1.00.

This particular type of motor is manufactured in a limited number of specifications to make for low cost advantages which can be gained in mass production.

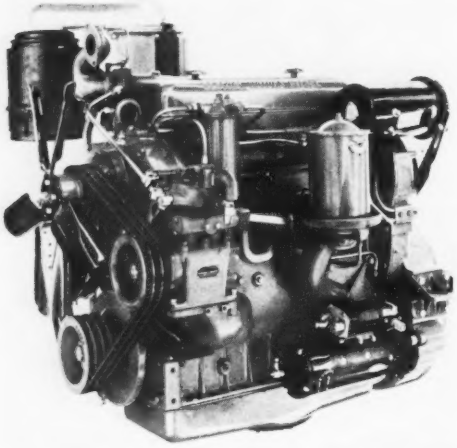
Features embodied in the design of new motor include: Rigid cast-iron end brackets of drip-proof design; rigid welded steel frame; feet welded to frame, and held to accurate shaft height dimension; thick-walled phosphor bronze sleeve bearing with thrust collar; and wool yarn lubrication with reserve oil capacity. Shaft is precision ground, rotor is high pressure cast aluminum, and both are dynamically balanced for minimum vibration.

Insulation on wire is plastic (polyvinol acetal). Also plastic (phenol formaldehyde) is its baked varnish. Rotor lamination iron is skewed for quiet operation.

Motors can be furnished with cushion base, if required.—*Century Electric Co.*, 1806 *Pine St., St. Louis.*

Circle 103B on Reader Service Card

New Tractor Diesel Engines Are Faster, Use Less Fuel



Increased horsepower, better fuel economy and longer engine life are three outstanding improvements credited to new design changes in the GMC two-cycle truck and tractor diesel engines.

None of the changes will make obsolete former diesel engines, since the new components were especially designed to be interchangeable with the old. The engines improved are the four-cylinder Model 4-71 and the six-cylinder Model 6-71.

An increase of 12½ percent in horsepower has been provided in each engine model. That of the 4-71 has been raised from 133 to 150 and that of the 6-71 from 200 to 225.

The greater horsepower has been secured by increasing governed top speed of the new engines from 2,000 to 2,100 rpm.—through upping size of fuel injectors from 70 to 80 cu. mm., and by changing camshafts so valves are kept open through a greater portion of the shaft revolution.

The improved fuel economy is principally via a new device called a fuel modulator. This is an automatic control that feeds exactly the right amount of fuel and air for maximum efficiency, regardless of engine throttle position.

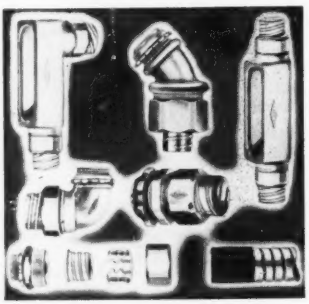
The modulator is seen most effective in controlling flow of fuel at engine speeds below 1,500 rpm. In the former engine models, excess fuel could still be injected at lower engine speeds notwithstanding blower speed being reduced correspondingly. As for engine speeds above 1,500 rpm., here the previously mentioned new camshaft is stated to improve fuel economy approximately 6 percent through the new range of valve operation.

Further features intended to lengthen engine life include a stronger crankshaft; heavy-duty copper-lead bearings on both shaft and connecting rods; a Houde viscous damper to control torsional vibration; Stellite-faced valves with 30 deg. instead of 45 deg. seats to better withstand valve seating action at the higher speeds; chrome-plated top piston rings to minimize sticking; and a new type of oil ring expected to reduce amount of oil consumed.

The higher range of engine speed and additional horsepower are designed to enable higher average road speeds, especially on long runs with many hills. Better control of the fuel feed at low engine speeds is aimed for improvement of city truck operations, with reduced maintenance seen through restriction of sludge and carbon. The longer-open valves should provide better scavenging of the burned gases and better charges of fresh air.—*GMC Truck & Coach Div., General Motors Corp., 660 S. Blvd., East, Pontiac 11, Mich.*

Circle 104A on Reader Service Card

Easy-to-Use Fittings Are Liquid-Tight



These new liquid- and vapor-tight, positive-ground fittings are used to connect synthetic covered flexible metallic conduit. This types of conduit and fitting is recommended where water, oil, chemicals, grease, dirt, corrosive fumes, are present, or where small movements and hard-to-get-at places are factors.

Known as Vap-Oil-Tite, these easy-to-use fittings have a special feature in the threaded bushing or ferrule that threads into the spiral between the convolutions of metal core of the conduit, thus insuring a fool-proof, positive ground. This bushing also makes it unnecessary to burr the ends of the metal core after cutting, since a collar covers the rough edges.

Fittings are furnished in sizes from ⅜ in. to 2 in. They require no other parts or materials to make leak-proof connection. Job can be done with a wrench or a pair of pliers.—*Simplet Electric Co., 3602 Potomac Avenue, Chicago 51.*

Circle 104B on Reader Service Card

Unit Accurately Controls Process Temperatures

This rugged, compact, wide-range regulator, combined with valves or dampers, is stated to provide accurate control over liquid or air temperatures in a wide variety of processes.

Known as Accritem, the instrument is air- or water-operated and can be used on instantaneous-type large-volume water heaters, processing ovens, diesel engine cooling systems, humidifying apparatus, and in dough and proof rooms.

Regulator is mounted with the thermostatic bulb at point where desired temperature is to be maintained. Easy-to-read gages tell performance at a glance. To change the operating temperature, attendant merely turns the large adjustment knob to the desired point on the dial. No special keys or wrenches are required.

A readily accessible restriction-screw makes it easy to change the Accritem from gradual to positive-acting.

Use of very few moving parts extends time of trouble-free operation.

Sensitive element of instrument consists of an Invar rod enclosed by a silver-soldered copper bulb. Long-wearing phosphor bronze is used for the restriction valve, thermal valve, and valve seat. Body and other internal parts are of brass.

In operation, the unit requires a clean, reliable supply of water or compressed air at 15 to 20 psi. When water-operated, a drip plug is furnished that discharges to the drain or sewer at atmospheric pressure. A change in temperature at the bulb positions the thermal valve to vary the pressure and thus effect control of whatever device is interrelated. Instrument can be used either direct- or reverse-acting, as follows:

Direct: With a rise in temperature at bulb, regulator increases control line pressure to close a direct-acting (spring opened) valve. With a drop in temperature at bulb, regulator lowers control line pressure to open a direct-acting valve.

Reverse-acting: With a rise in temperature at bulb, regulator lowers control line pressure to close a reverse-acting (spring closed) valve. With a drop in temperature at bulb, regulator increases control line pressure to open a reverse-acting valve.

It is termed only a matter of minutes to change the unit from direct to reverse-acting. No extra parts or special tools are needed.

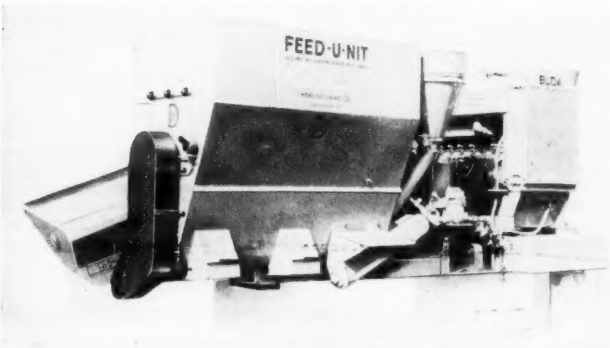
Unit has a range of 200 deg. F., the standard dial being calibrated between 50 and 250 deg. F. It is also available with a range of 150 to 350 deg. F.

Sensitivity is adjustable between the limits of ¼ and 2¼ lb. per 1 deg. F. temperature change.

Each regulator is furnished with easily read supply and control gages. All fittings are brass. Supply and control connections to the regulator are ½ in. N.P.T.—*The Powers Regulator Co., 2720 Greenview Ave., Chicago 14.*

Circle 105A on Reader Service Card

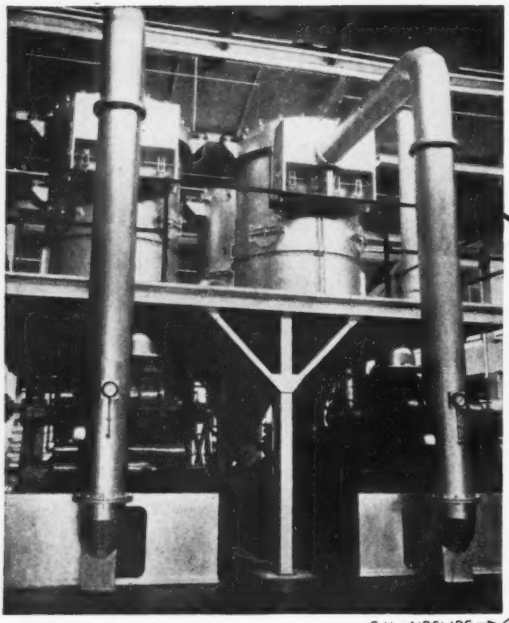
Packaged Feed Plant Easy to Install



A complete feed-manufacturing plant engineered into one compact package has been developed. Known as Daffin Feed-U-Nit, Model 1650-S, it is readily installed and occupies a floor space of only 12 ft. by 20 ft. It is stated to accomplish the entire milling job from grinding and mixing to bagging or bulk handling—all in a single practically dust-free operation. Diesel or electric power units are recommended for use with these production machines.

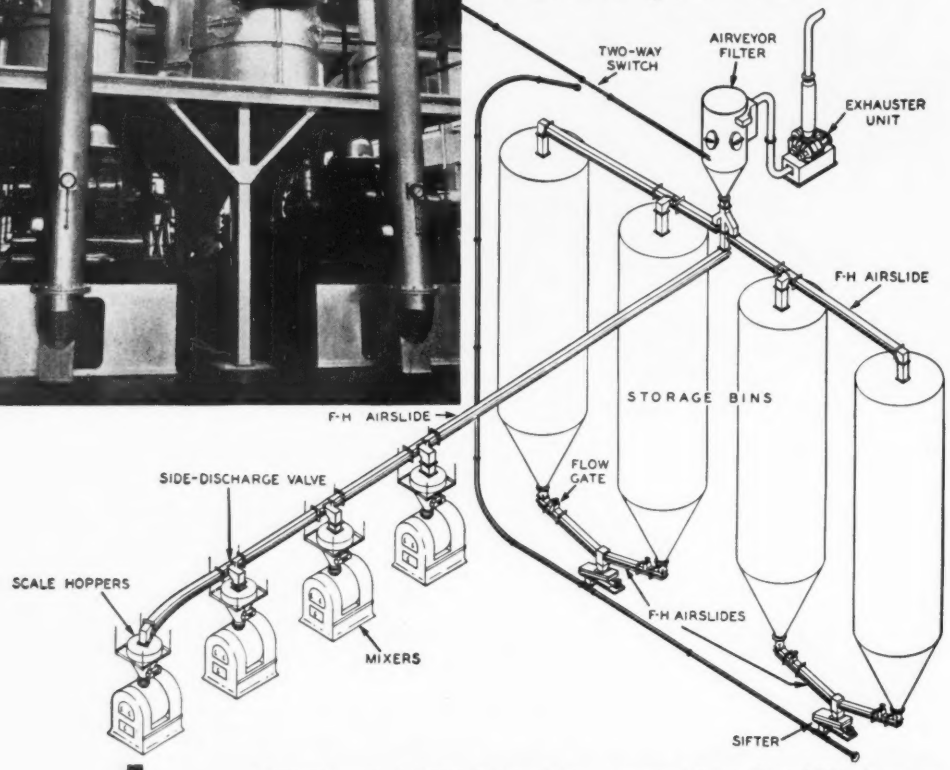
Plant is capable of manufacturing 6-8 tons of feed per hour. Continuous mixing and bagging will enable operator to increase this capacity. Incorporated is a patented device for blending molasses and concentrates with the feed as it is mixed. A model is also available in mobile form.—*Daffin Manufacturing Co., Div. of Lancaster Engineering Co., Lancaster, Pa.*

Circle 105B on Reader Service Card



NOW FLOUR *flows* FROM MILL TO LOAF

. . . untouched by human hands



More and more the larger baking plants are handling flour in bulk—*flowing* it from mill-sealed hopper-bottom cars, to storage or mixers. With or without sealed cars, it's the cleanest, safest, most economical method yet devised—and it's a one-man, push-button job at the bakery.

The Airveyor and the F-H Airslide Conveyor effect major economies wherever they are installed for unloading and in-plant conveying. They eliminate dusting, reduce manpower, keep down loss.

The conveying system is simplicity itself. There are few moving parts. Maintenance is lower, dependability is greater. The simple duct or pipe system, without sharp turns and pockets, prevents flour accumulation and possible infestation. The system is self-cleaning, and 100% retention of all visible dust is guaranteed.

With manpower shortages, maintenance and operating costs on the rise, it will more than pay you to investigate *flowing* flour. Why not have a Fuller Conveying Engineer analyze your present methods of handling flour and other dry, pulverized food materials? There's no obligation.

Fuller

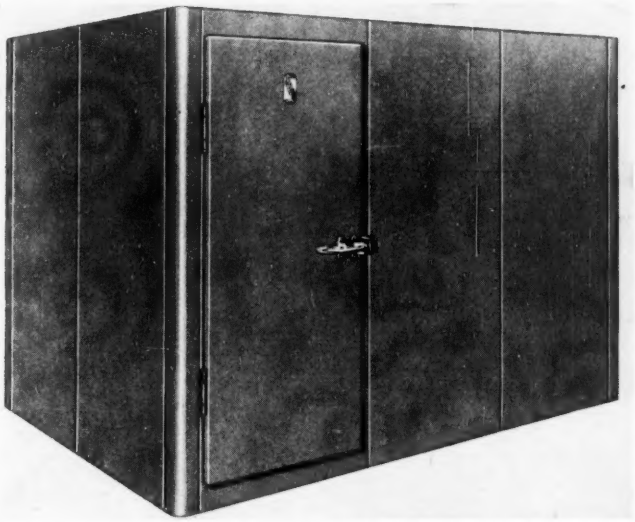
DRY MATERIAL CONVEYING SYSTEMS AND COOLERS • COMPRESSORS AND VACUUM PUMPS FEEDERS AND ASSOCIATED EQUIPMENT

7697

FULLER COMPANY
Catasauqua, Pennsylvania
Chicago 3—120 So. LaSalle St.
San Francisco 4—420 Chancery Bldg.

A 122

Walk-In Cooler Maintains Multiple Temperatures



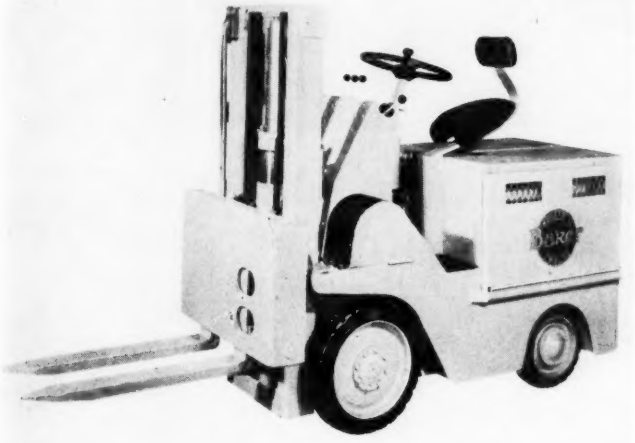
Here is an easy-to-erect walk-in cooler offering two or three different rooms in which a corresponding number of temperatures from −20 to +40 deg. F. can be maintained. Unit requires only one blower system, one expansion valve, and one installation hookup.

Requiring a minimum headroom of 6 ft. 10 in., cooler is available with glass or solid door service panel. Exterior of unit is constructed of heavy gage steel, while interior walls and ceilings are panelled with 5-ply marine-type laminated wood. Provided on floor are 1½-in. tongue-and-groove boards covered with heavy galvanized steel. Semi-rigid 4 in. Fiberglas insulation is employed. It is sealed to lining throughout.

Door assembly has heavy chrome-plated matte finish hardware, and can fit in place of any side panel. Heavy channel iron is used to reinforce the door sill.—*Uniflow Manufacturing Co., Erie, Pa.*

Circle 107A on Reader Service Card

New Lift Carriage Ups Truck's Versatility



This 2,000 to 4,000 lb. capacity, fork truck is equipped with a new, special lift carriage assembly aimed to make the unit a multi-purpose handling machine.

From one adjustment it functions (1) as a standard fork truck for pallet and ordinary fork truck work; (2) as a clamp truck for jobs with drums, cartons, skid boxes; and (3) as a fork-spacer permitting the handling of varying widths of pallets, skids, or other loads. A simple adjustment converts the unit into a side-shifting fork truck for speeding many carloading and storing operations by making it easier to line up loads in close quarters.

It takes less than a minute to change from fork-spacer and clamp to side shifter. No tools are required. Conversion is quick—changing one pin and block. Lateral movement of the fork in each case is operator-controlled by a lever conveniently located on the dash. Action is hydraulic, with roller conveyor chain linkage.

Available in 36 in., 42 in., and 48 in., outside fork spread, it provides 17 in. of fork-spacer and clamp action. And as a side shifter there is provided 4¼-in. lateral movement each side of center.

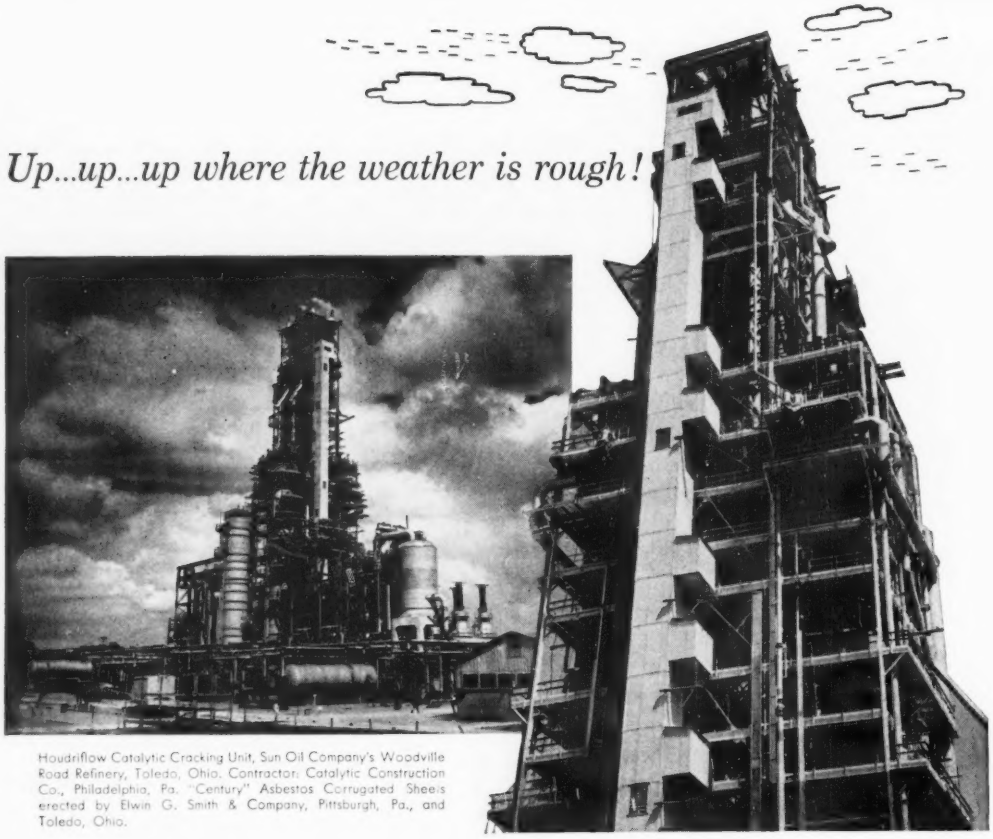
With shoe attachments for use with clamping action the 36 in. unit will handle drums and other cylindrical objects of up to 24¾ in. dia.—*The Baker-Raulang Co., 1250 W. 80th St., Cleveland 2.*

Circle 107B on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service Section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.

Up...up...up where the weather is rough!



Houdriflow Catalytic Cracking Unit, Sun Oil Company's Woodville Road Refinery, Toledo, Ohio. Contractor: Catalytic Construction Co., Philadelphia, Pa. "Century" Asbestos Corrugated Sheets erected by Elwin G. Smith & Company, Pittsburgh, Pa., and Toledo, Ohio.

Men and equipment are permanently protected by "Century"® Corrugated Asbestos-Cement Sheets

High on the side of this catalytic cracking tower there are no wind breaks . . . no shade . . . nothing to block driving rain and the fury of storm. Yet inside the elevator tower it's always dry . . . always protected . . . always "a nice day." "Century" Corrugated Asbestos-Cement Sheets make a completely weather-tight enclosure—give permanent protection to men and equipment.

And, despite the fact that the tower is exposed to the elements, maintenance will never be a problem. For in addition to resisting weather, "Century" Asbestos Corrugated *can not burn, rot, or rust*—rodents and termites can't hurt it. It doesn't even need protective painting to preserve it. Consider the maintenance costs these characteristics save!

"Century" Asbestos Corrugated can be applied quickly, easily, inexpensively. The large-size sheets are exceptionally strong, but they can be cut and drilled with ordinary working tools—can be fastened in place with a minimum of labor.

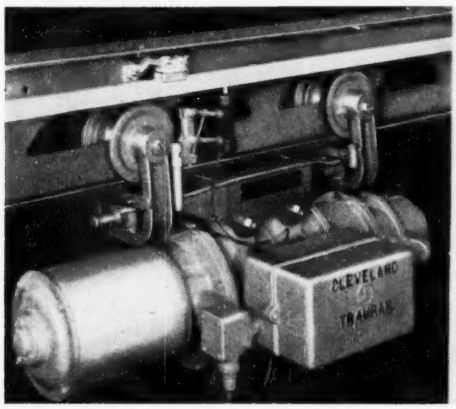
Whatever your building plans—new construction, expansion, or modernization—it will pay you to consider cost-saving "Century" Corrugated Asbestos-Cement Sheets for both siding and roofing. We'll be glad to send complete details on request.

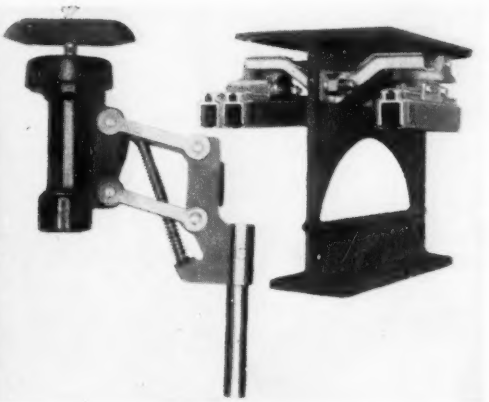
Nature made Asbestos...
Keasbey & Mattison
has made it serve mankind since 1873

K&M Best in asbestos

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

System Provides Added Safety for Overhead Carriers





Announced is a new type of electrification for overhead cranes and tramrail systems. Design aim has been maximum safety.

Crux of the improvement is the Saf-Powr-Bar, consisting of inverted U-shaped conductor bars inside of which operate sliding current-collector shoes. This electrification arrangement may be applied to all new systems, or used for replacement in open-bar electrification. It may also be installed on many hand-propelled systems (type illustrated above, left) where motor-powered hoists, carriers, or cranes are now desirable.

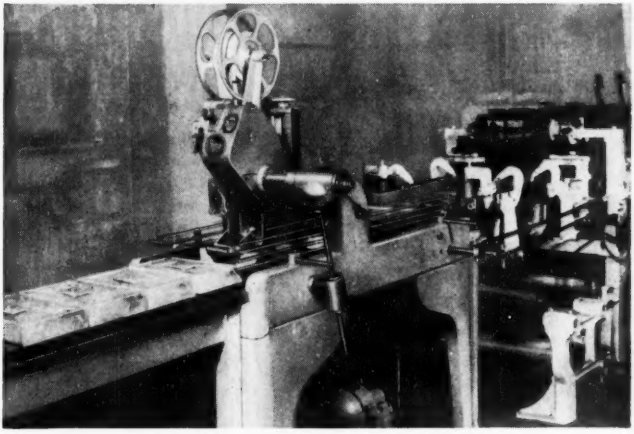
Safety feature is that unit prevents accidental contact with an electrified conductor bar. Shocks or burns from contact are prevented because power bar is enclosed with an insulating plastic covering (illustrated above on extreme right).

Sliding current-collector shoes contact three sides of bar and operate on a pantographic principle. A diagonal spring provides upward pressure on the graphite collector shoe, while a torsion spring within a plastic housing causes pressure to be applied on both sides of the conductor bar (middle photo, above).

Service life says maker, is greatly extended with use of a sliding shoe, as compared to an open bar with collector wheels. Actual tests on installations in the field are stated to have confirmed results of research tests indicating very high life of graphite collector shoes. —*Cleveland Tramrail Div., The Cleveland Crane & Engineering Co., Wickliffe, Ohio.*

Circle 109A on Reader Service Card

Movable Device Simplifies Label Needs



This portable, automatic top labeler with imprinter is designed to eliminate the need of maintaining inventory of different types of labels, since a single stock label can be imprinted differently for various products.

New unit automatically imprints and applies thermoplastic roll stock labels to tops of packages, either on or off center. It can be operated either under its own power or connected to wrapper or conveyor.

With a speed far in excess of that of any wrapping equipment, the unit can be used for a wide variety of goods—bread, rolls, specialty loaves, brown 'n serve, sweet goods, cakes, pies, cookies, or frozen baked goods. Easily adjustable, it will handle packages as small as 4 in. x 1 in. x ½ in. to as large as 18 in. x 6 in. x 10 in. A "No package—No label" feature assures against label waste.

Using an easily changed, self-adhesive-backed rubber plate, the mechanism can imprint sales messages, product names, code-dates, quantities, weights, ingredients, and prices.—*Bakery Division, American Machine & Foundry Co., 485 Fifth Ave., New York City 17, N. Y.*

Circle 109B on Reader Service Card

Make the most of this combination....

1. *Continuing basic research . . .* in corn products chemistry, directed by the foremost research men in the industry.

2. *Technical and engineering services . . .* to help you apply new methods and new products to your production setup. No obligation for on-the-spot studies. (Write our Technical Sales Department.)

3. *Fine products of uniform quality . . .* from a dependable, large volume source of supply.

CERELOSE BRAND dextrose

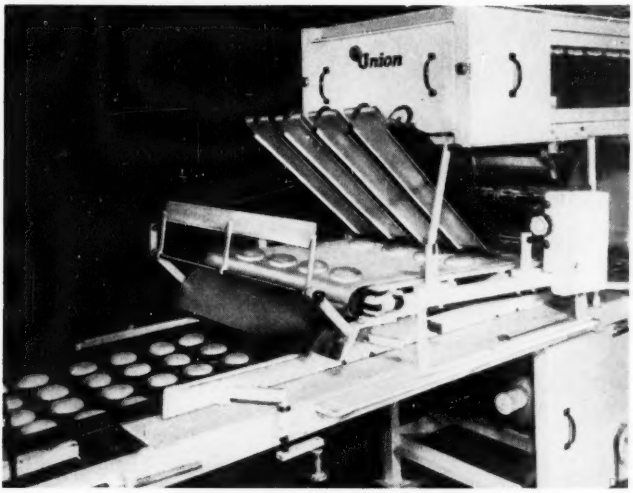
PURITOSE BRAND CORN SYRUP

GLOBE BRAND CORN SYRUP

● Globe, Cerelose, Puritose, Buffalo and Hudson River are registered trade-marks of Corn Products Refining Company, New York, N. Y.

CORN PRODUCTS REFINING COMPANY, 17 BATTERY PLACE, NEW YORK 4, N. Y.

Unit Proofs, Molds, Pans Buns Automatically



After months of development and plant testing, a new, completely mechanized bun make-up and panning unit —the AMF Union Pan-O-Mat—is now being manufactured.

Unit picks up dough pieces produced by an automatic bun machine (a separate unit), proofs in transit, and discharges them onto a wide conveyor belt. Empty pans, fed into the unit, move forward and, in the case of hamburger buns, flattened dough pieces are deposited uniformly in center of pan spaces.

For frankfurter buns, a pressure board assembly is lowered into position. Flattened dough pieces are curled and molded, with well-rounded ends, and are deposited automatically and uniformly into pans.

Machine produces 280 hamburger or frankfurter buns a minute. One operator feeds pans into machine, another racks the panned product. Buns are not touched by hand in the process, making the operation completely sanitary.—*Union Machinery Co., Joliet, Ill.*

Circle 111A on Reader Service Card

New Air-Operated Vibrator Is Noiseless

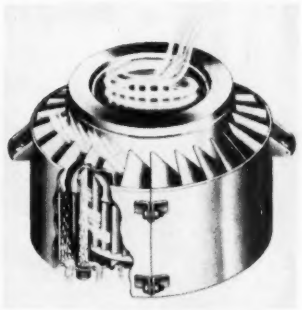
Recently developed is a noiseless air vibrator for packaging food stuffs. It is known as the Type AC unit.

Vibrator is described as suitable for applications where the air operations are at close proximity to employees and hence where noise is a factor to be minimized.

Basically, the reciprocating action of a hard chrome-plated piston develops the vibrating action. This is noiseless because the momentum set up by the piston is cushioned by a "pocket" of air at each end of the vibrator assembly. Speed and intensity of vibration are adjustable and can be varied at will.

The Type AC weighs 2 lb. 11 oz., is 6½ in. long and 1½ in. wide. Company produces a complete line of air vibration equipment, with 29 mountings and 14 piston dia. sizes covering a wide range of vibration intensities. —*The Cleveland Vibrator Co., 2874 Clinton Ave., Cleveland.*

Circle 111B on Reader Service Card



Purifier Delivers Vapor With Low Total Solids

A new purifier of the internal type having a wide range of applications inside steam drums, flash tanks, evaporators, deodorizers and stills, has been announced.

Called the Hi-eF Purifier, the unit is guaranteed by maker to deliver vapor with 1.0 ppm. or less of total solids.

Advantages reported by maker are the elimination of operating, maintenance and replacements costs. Improved design provides for a self-cleaning action that eliminates maintenance. Unit contains no moving parts. Pressure drop through the unit is low. Minimum space is occupied inside a drum or receiver.

In operation, entrainment is removed in three stages. Laden vapor enters top of purifier as far away from liquid level as possible, passes downward in a rotary motion. This action develops centrifugal force, which removes the greater portion of entrainment at this stage.

In second stage of separation, rapid rotation is reduced to slow linear flow, causing additional entrainment to drop out. Again, in last stage, centrifugal force is developed effecting practically complete removal of any remaining entrainment before the vapor continues up and out the evaporator outlet. Entrainment is discharged below the liquid level by means of ejects.

In the case of steam from boilers, clean steam means longer life for reciprocating engines and turbines, longer tube life for superheater tubes, and longer operating periods between shut downs.

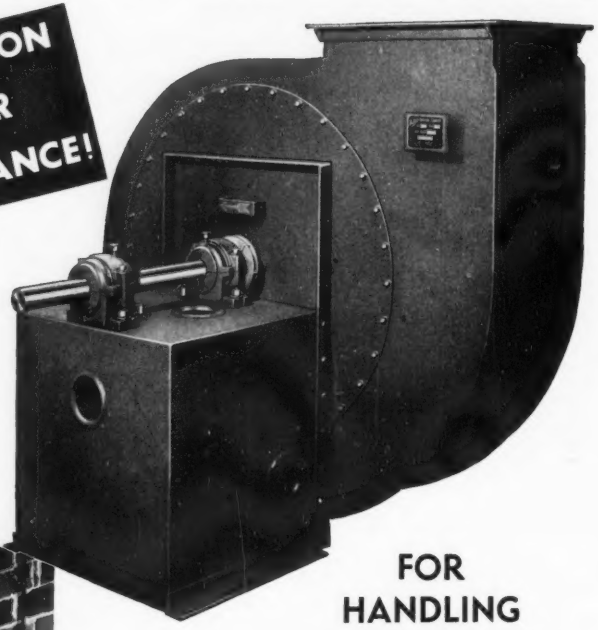
Purifiers are available in a complete range of sizes in fabricated steel, stainless steels, and other alloy materials.—*Steam Specialty Div., V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.*

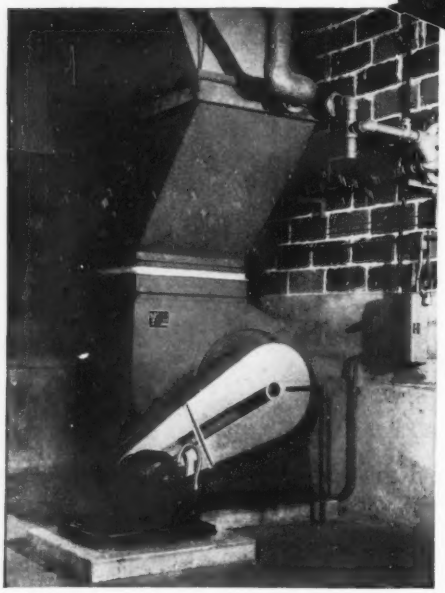
Circle 111C on Reader Service Card

AIR. BASIC TOOL IN FOOD PROCESSING

YOU CAN DEPEND ON "Buffalo" FANS FOR AIR PERFORMANCE!

From simple ventilation to air circulation for quick freezing, air is a valuable tool in every type of food plant! And you'll find "Buffalo" Fans doing these many jobs to complete satisfaction. Here are two examples of "Buffalo" Fans that help make better food—





FOR HANDLING HOT GAS!
(or material conveying)

Above is a well-known "work" fan, the "Buffalo" Industrial Exhauster. This model is equipped with a heat slinger (a small rotor mounted on shaft nearest housing) and is capable of handling gases up to 720 deg. F. Of all-welded rugged steel plate construction, it is effective in a wide variety of exhausting applications—and may be had with interchangeable Material Wheels or Air Wheels.
WRITE FOR BULLETIN 3576-B.

FOR THE LARGE VENTILATION AND AIR CONDITIONING JOBS!

At left is a "Buffalo" Limit-Load Fan, famous for its quietness, efficiency and non-overloading characteristic. Processing and packing plants put the "LL" to many profitable uses. *Write us for the facts*—this fan is made in sizes up to 500,000 cfm. to meet most requirements.

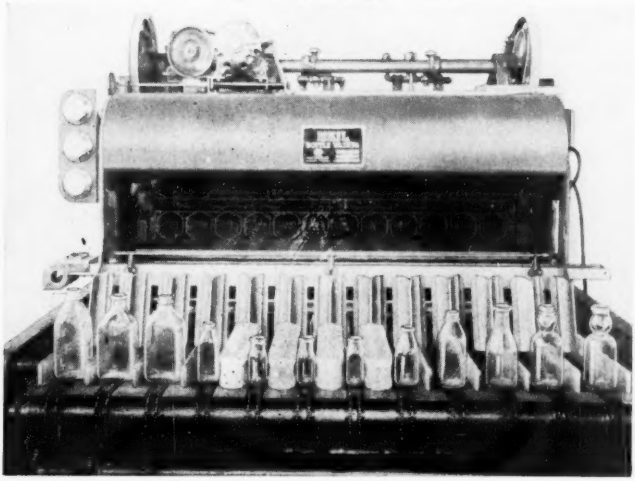
"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Branch offices in all Principal Cities

VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT EXHAUSTING PRESSURE BLOWING

Washer Handles Any Size, Shape Milk Bottle



This new model washer is claimed to be the first unit capable of washing any size and any shape of milk bottle from ½ pt. to 2 qt., including the rectangular shape.

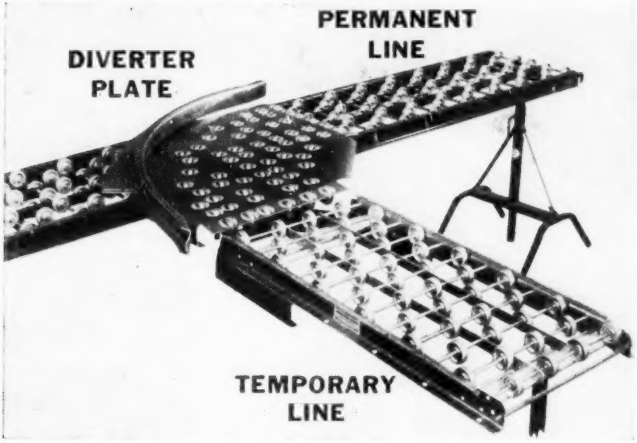
Known as Model G2Q, it employs a newly designed pocket to permit the wide size range in handling. The special pocket is standard equipment on the machine.

Load and discharge boards have been redesigned to achieve smooth handling of all type of bottles. It is stated that no mechanical adjustment is necessary. To change from one bottle size to another requires only addition or removal of load table dividers. These may be slipped on or off in seconds.

Machine is designed to wash from 40 to 120 bottle per minute. It is obtainable in 8 and 12 wide sizes.—*The Heil Co., Milwaukee, Wis.*

Circle 113A on Reader Service Card

Diverter Installs Fast and Easily



With this new conveyor-line attachment, temporary spur lines can be set up quickly and easily on either side of a main conveyor.

Known as Flow Diverter, it connects to any point on a permanent-line gravity wheel conveyor to move cartons in and out of storage without manual handling.

Diverter kit is made up of a connecting yoke fastened to a 3-ft. section of aluminum incorporating conveyor wheels, and a slotted aluminum plate that fits over the latter so conveyor wheels project slightly above the surface. An adjustable curved aluminum guard rail also is included.

To set up a spur line, the connecting yoke bracket is hooked over the side frame of the permanent conveyor at the desired switching point, then a support stand is placed under the opposite end of the 3 ft. wheel section. Plate is then placed on permanent conveyor line at intersecting point to transfer goods from main line to spur, or vice versa. Gravity sections may be added to outer end of auxiliary line to obtain a flow cartons in and out of deep storage bays.

Diverter can be used with 18 in. width wheel gravity conveyor that has either 16 or 18 wheels to the foot. Lightweight aluminum construction allows entire kit to be transferred easily from one spot to another.—*The Rapids-Standard Co., Inc., Rapistan Bldg., Grand Rapids, 2, Mich.*

Circle 113B on Reader Service Card

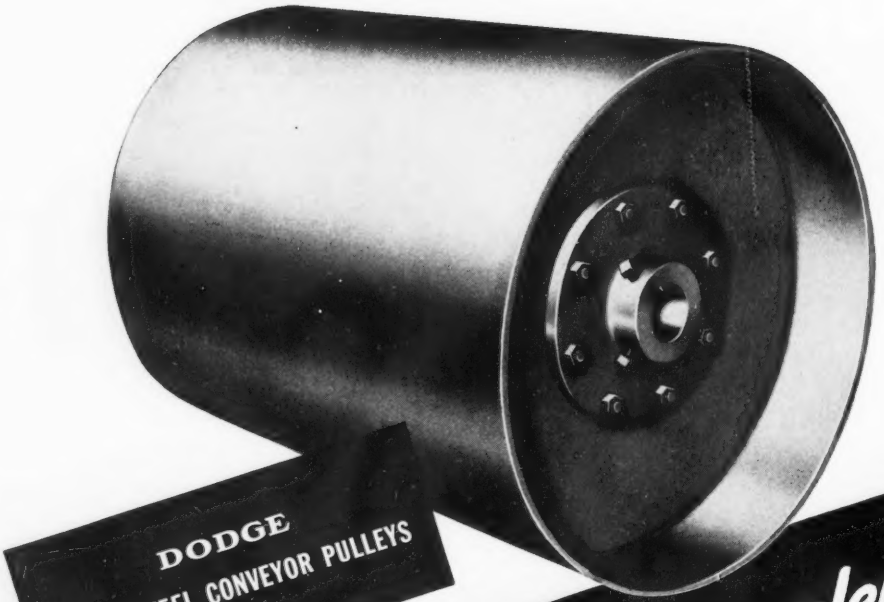
Device Removes Waxes From Waste Water

Announcement is made of an interceptor grid to check and remove paraffin and other waxes from waste water.

Plants using paraffin or other waxes to waterproof paper bottles, drinking cups, and other types of containers, often find that the wax congeals on the sides of the waste pipe lines, eventually leading to clogging and expensive repairs.

With the use of this new unit, maker claims that approximately 96 percent of the paraffin can be intercepted and removed for sale or re-use. Pipe lines are thus kept free. Interceptors are furnished in cast iron or steel depending on the size required.—*Josam Manufacturing Co., Josam Bldg., Cleveland 13.*

Circle 113C on Reader Service Card



DODGE

SOLID STEEL CONVEYOR PULLEYS

So-o much Simpler!

- The pulley for *modern* belt conveyors.
- Drum type construction provides maximum strength with minimum weight.
- Interchangeable hubs simplify installation, positioning, removal — insure better conveyors at *less* cost.
- Accurately formed. Uniform rim thickness. Fully enclosed — to exclude dust, dirt, water.
- Diameters 6 in. to 8 ft., all face widths. Popular sizes stocked by our distributors.

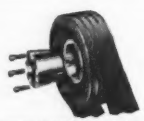
DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified telephone directory.

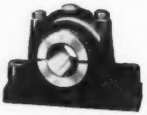
DODGE MANUFACTURING CORPORATION
2800 Union Street, Mishawaka, Indiana

FIRST IN POWER TRANSMISSION MACHINERY!



V-BELTS AND TAPER-LOCK SHEAVES

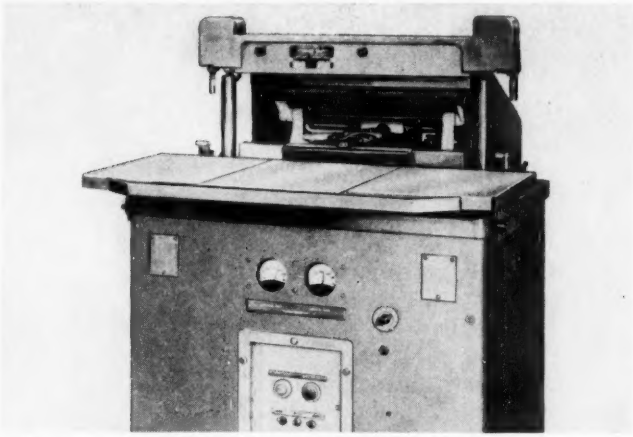
TORQUE-ARM SPEED REDUCERS



DODGE-TIMKEN PILLOW BLOCKS

ROLLING GRIP AND DIAMOND B CLUTCHES

Plastic Bag Vacuum-Sealer Is Fast, Efficient



Rapid vacuumizing and sealing of plastic bags containing poultry, meats, cheese, fish, is claimed with use of the new EVS 108 machine.

Complete vacuumizing and uniformly tight seals are reported, thus assuring overall tightness of wrap and neat final appearance.

The separate, easily operated vacuum-actuating bar increases vacuumizing time and eliminates all air from the envelope. Specially designed spreader bars eliminate wrinkles at the seal, producing a smooth, leakproof closure of the bag.

Automatic vacuum and sealing cycles, plus thermostatic temperature controls on the sealing bar, give consistently uniform seals, thus saving packing materials otherwise lost due to faulty sealing. Also saved are labor and time formerly expended to unpack and repack products wrapped inadequately.

Design of the machine permits high speed operation with only one operator, thus conserving manpower. The evacuating cycle and sealing time are easily adjusted. The sealing cycle is automatic, with pre-set controls for type and weight of film.

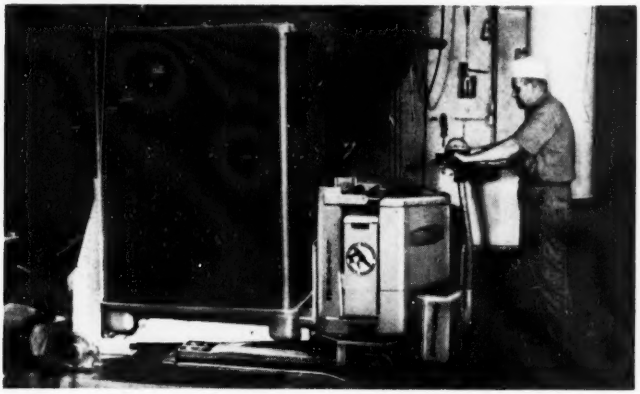
Speeds of up to 15-18 bags per minute can be obtained, depending on product size. Generally, smaller bags can be used than previously, affording savings in the cost of packing materials. Scrap is automatically rejected after the sealing operation has been completed.

Operator protection is assured by safety devices, including an emergency bar which, when depressed, stops the cycle. Machine then returns immediately to starting position. This bar also allows the operator to recycle the machine in the case of an improperly packed bag. Start buttons are installed in pairs, requiring use of both hands and thereby providing further safety for the operator.

The machine is capable of handling envelopes from a minimum size of 4-in. to a maximum of 18-in. Electrical power supply required is 110v. 60 cycle a.c. Space requirements for the unit: 25-in. x 36½-in. x 50-3/16-in. Weight of machine is approximately 750 lb.—*Standard-Knapp, Div. of Emhart Mfg. Co., Portland, Conn.*

Circle 115A on Reader Service Card

Unit Simplifies Tote-Bin Handling



Added to the line of materials handling equipment is this unique design "Jackstacker" especially made for handling Tote bins and other tightly sealed containers for shipping, and for storing bulk materials.

Stacker is made in both telescopic and non-telescopic types that will take 4,000 lb. loads up to 48 in. long. Former type has a fork elevation of 53 in., latter has a fork elevation of 77 in. so that bins can be easily double-decked in the areas that have been designated for storage.

Lifting forks are constructed to provide ample clearance on each side of bin tilt racks. A special lifting arrangement on the stacker tilts the tote bins.

Both front and rear wheels, as well as stabilizing casters, are rubber tired to provide smooth roll and maximum floor protection.

Unit has two speeds forward and reverse, electric lift and lowering, and spring-set, electrically released brake. All controls for the above functions are in the handle head and can be operated with the handle in any position including vertical.

Other features: High precision double reduction gear drive, GE. heavy-duty traction motor and controls, hydraulic lift, and extra heavy duty frame construction with four-point load support.—*Lewis-Shepard Products, Inc., 194 Walnut St., Watertown 72, Mass.*

Circle 115B on Reader Service Card

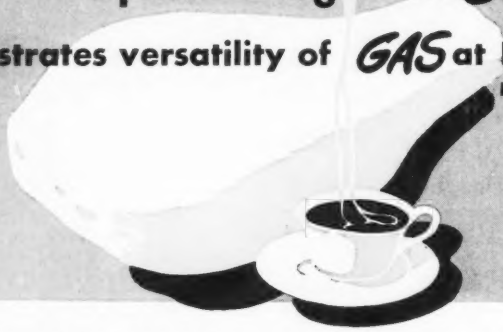
One of Bohack's 3-story Gas-fired smoke-houses, where Gas pipe burners char Hickory sawdust to generate aromatic smoke for curing and smoking of hams.

2-four-bag Burns Gas-fired coffee roasters process the blends packaged under Bohack brand names, Maxon premix burners Gas-fire the roasters. Cycle: 600° to 650°F for 20 minutes.

food processing with GAS

demonstrates versatility of GAS at H. C. BOHACK CO., Inc.

BROOKLYN, NEW YORK



The Gas-fired smoke-houses and Gas coffee roasting equipment illustrated only begins to tell the story of how Gas is used to process a variety of foodstuffs at H. C. Bohack Co., Inc. of Brooklyn. This organization processes, distributes and sells at retail through 282 outlets. In the sales year ending January 31, 1951, Bohack sold 40 million pounds of meats and 9 million loaves of bread, along with their many other food lines.

The bakery, for example, uses dependable Gas flames to bake 250,000 loaves of bread a week, 8,000 pies a week, and 1,000 dozen doughnuts a day. Gas-fired bakery equipment includes:

- Baker-Perkins direct Gas-fired travelling oven
- Baker-Perkins "Diathermatic" 15-tray Gas-fired cake oven
- 3 Fish Rotary Hearth Gas ovens for baking pies
- Gas-fired Jo-Lo Vitamatic doughnut fryer.

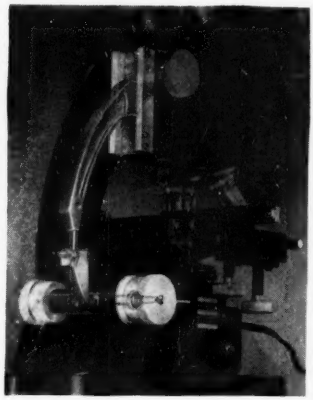
The meat-processing departments utilize Gas in the preparation of 175,000 pounds of frankfurters, bolognas and wursts per month, in addition to 500,000 pounds of smoked pork cuts. Beef cuts are aged in rooms under complete automatic temperature and humidity control.

H. C. Bohack Co., Inc. is one example of how GAS serves the mammoth Foods Processing Industry. Gas is the versatile, modern, foods-processing fuel, because GAS is clean, GAS is efficient, and GAS is economical. Find out the facts on Modern Gas Equipment from your Gas Company Representative. Call him today.

MORE AND MORE...
THE TREND IS TO GAS
FOR HEAT PROCESSING OF FOODS

AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVE. • NEW YORK 17, NEW YORK

Focusing System Improved on New Lab Microscopes



Ball bearings and rollers are used throughout the focusing system in a new line of laboratory microscopes. Called Dynoptic Labroscopes, new instruments also feature a low position fine adjustment and a mechanical stage with low controls, enabling operator, after setting the coarse adjustment, to rest his hand on the table and manipulate the other controls in a comfortably relaxed position.

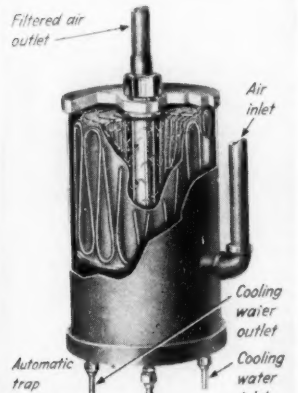
A ball bearing on the horizontal shaft of the low position fine adjustment absorbs thrust, assuring effortless turning of focusing knob. Two rollers on the lever transfer horizontal movement of the screw to vertical travel of the focusing slide, which is fitted with ball bearings assembled in pressure plates. Finally, the nosepiece has ball bearings around its outer rim and a ball stop, a combination assuring parcentricity over a long period.

Substage equipment includes a variable focus condenser in a tubular mount that does not require a rack and pinion substage. Also, a substage illuminator is available that can be used integrally with the Labroscope, in place of the mirror or separately.

Optical equipment for the new instruments includes a new, longer working distance and non-divisible 10x achromatic objective.—*Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.*

Circle 117A on Reader Service Card

Condense-Filter Dries, Cleans Compressed Air



Water, oil, sludge and other foreign material are removed from compressed air by the Model B Condensifilter.

Combining, in a single unit, a dehydrating device, a mechanical filter, and a self-purging trap, the assembly provides dry, clean compressed air for operating instruments. It measures 15-in. high by 9 in. dia. Capacity is 30 cfm. at 100 psi.

Unit is recommended (1) for purifying and dehydrating compressed air used in combustion and process control; (2) for pneumatic tools and laboratory equipment; and (3) for agitation equipment in food processing.

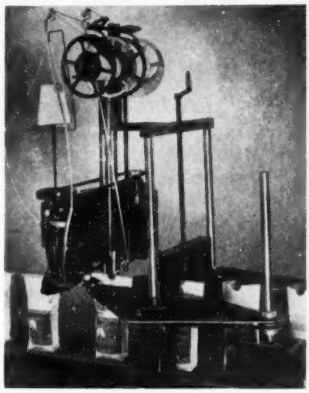
In operation, air is admitted through the side, next directed through condensing section, where it is dehydrated, and then passed through the mechanical filter. Total drop in pressure across the Condensifilter is reported less than 2 lb. at 100 psi. working pressure.

Condensing unit, which removes water in both entrained and vapor states, is composed of a series of copper coils through which cold water flows. Through this section, air temperature is reduced to within 2 deg. F. of the cooling water temperature; then when the air warms to atmospheric temperature again, a spread between temperature and dew point is effected.

Filtering unit is made of five hexagonal filter chambers in parallel, each chamber wrapped with seven layers of canton flannel. Easily removed for cleaning, it provides over 4 sq. ft. of filtering area, and it removes pieces as small as 1.0 to 2.0 microns. By taking off one 1½-in. SAE nut, entire filter is dismantled for cleaning and service. Removable filter cartridge is cleaned by immersing it as a complete unit in a suitable solvent.—*Hankison Corp., Renton Bldg., 1501 Beaver Ave., Pittsburgh 33.*

Circle 117B on Reader Service Card

Closes Paper Bags Fast, Easily, Neatly



Consumer-size paper packages are automatically pre-formed and passed through sewing heads at reported speeds of up to 1,500 per hr. in this B&D automatic bag closer.

Known as Model 1210-T, unit effects a Dubl-Tape sewn closure and turns top of bag above sewing line for improved package appearance. It is adapted for handling coffee, sugar, and many other products requiring "shelf appeal."

Basic principle is as follows: First, moving conveyors lead the filled bags between two V-belts. Latter collapse the tops of the bags and lead them through the sewing head without further handling. Speed of conveyor is synchronized with that of sewing head at 24 fpm. Since two or more filling stations can be coupled with this conveyor, the production rate is limited only by the efficiency of packaging operators and the speed of the bag filling units.

Unit is of all steel welded construction and is fitted with roller bearings. It is delivered complete with a standard 10-ft. conveyor. Also available are conveyors of 15 and 20 ft. length.

Machine was developed by Edward Dilatush Co., Robbinsville, N. J., in conjunction with *Union Bag & Paper Corp, 233 Broadway, New York City 7.*

Circle 117C on Reader Service Card

PECTINOL *Makes Fruit Products LOOK as Good as They TASTE*

PECTINOL brings to your fruit products eye-inviting clarity, while retaining taste-tempting flavor. Regardless of the product or the process, when PECTINOL goes in, cloudy sediment comes out—*fast!* Your beverages, concentrates, syrups or spreads *look* as good as they taste.

You need no special equipment to use PECTINOL. Just add these special enzymes to pressed juices or mashed fruits, give them a few hours to break down pectic substances, then filter your product clear of sludge and cloudy material. Easy. Inexpensive. Effective.

PECTINOL is used for:

Clarification of Fruit Juices
Clarification of Frozen Fruit Juice Concentrates
Clarification of Wines
Production of Vinegar
Production of Fountain Syrups
Production of Flavor Extracts
Production of Jellies

PECTINOL is effective on:

Apples, Grapes, Citrus Fruits
Cherries, Pears, Peaches
Blackberries, Strawberries
Raspberries, Elderberries, Dates
Loganberries, Papaya, Rhubarb

You'll also find PECTINOL used on fruit and vegetable wastes to recover valuable solids and readily dried presscakes.

OTHER INDUSTRIAL ENZYMES TO IMPROVE YOUR PROCESSING

Enzyme System	Designation	Availability	Action on Substrate
Pectinolytic	PECTINOL	Commercial	Demethoxylates pectic substances and hydrolyzes them to galacturonic acid. pH range 3.5-5.
	Pectin esterase	Experimental	Demethoxylates pectin without hydrolysis of the galacturonic acid chain. pH range 3.5-5.
Proteolytic	RHOZYME P-11	Commercial	Hydrolyze proteins to peptides and amino acids. pH ranges 5.5 - 8.5 (Relative amounts of peptides and amino acids will differ for each proteolytic enzyme.)
	Protease 15	Experimental	
	Protease 16	Experimental	
Amylolytic	RHOZYME S	Commercial	Hydrolysis of starch to dextrins, maltose and glucose. Contain both an alpha amylase and a strong glucogenic principle. pH range 5-6. RHOZYME S is a purified enzyme; RHOZYME T-22 the crude product.
	RHOZYME T-22	Commercial	
	RHOZYME DX	Commercial	Hydrolysis of starch to dextrins. Heat stable. pH range 5.5-6.5.
Lactase	Lactase B	Experimental	Hydrolysis of lactose to glucose and galactose. pH range 6.1-7.5.

For full information regarding PECTINOL, write to:

For the State of California:
A. R. Zacher Company, Inc.
434 P Street
Fresno, California
or 140 Spear Street
San Francisco, California

For Washington and Oregon:
Duncan Equipment Company
506 Broadway
Seattle 22, Washington

For Canada:
Rohm & Haas Company
of Canada, Limited
Terminal Building
Toronto 1, Canada

All other inquiries to Philadelphia office.

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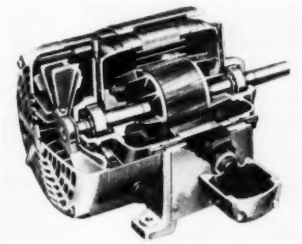
Explosion-Proof Motor For Hazardous Areas



Newly announced is development of a totally-enclosed explosion-proof motor with many features.

Made in capacities from 3 to 75 hp., a new Type SE and Type SES power units carry the Underwriters' label in Class 1, Group D, for highly inflammable gases and volatile liquids, and in Class 11, Groups F and G, for combustible dusts.

Features incorporated include: Sealed terminal, elongated spark-arresting bearing sleeves, streamlined housing, hi-draft ventilation, removable cover, split hub fan, normalized castings, Lubriflush bearings, asbestos-protected windings, and solid, centrieast rotor.

Complete sealing gives protection against external hazards, preventing intrusion of abrasives, acids, moisture and other deleterious substances.—*U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54.*

Circle 119A on Reader Service Card

Cases Sealed Speedily With New Adhesive

Use of an improved case glue provides fast permanent, non-crystallizing bonding of box flaps that reinforces the rated strength of corrugated cases to resist both lateral and vertical strains. And, use of Boxeal, as substance is called, thwarts pilferage, since opening of cartoning flaps requires destructive effort, thus making it difficult to conceal evidence of tampered cartons.

Operating on all varieties of containers, this dextrinized starch adhesive can be applied by machine or hand brushing in 20 to 45 sec. When used in automatic case sealing machines, it can be used as received for fast bonding, whereas for hand brushing it can be diluted with water for easy application.

Glue is claimed to be non-toxic, noncorrosive, and non injurious, to hands, face or clothes of workers.—*Paisley Products, Inc. Div., Morningstar, Nicol, Inc.,* 1770 *Canalport Ave., Chicago* 16.

Circle 119B on Reader Service Card

New Flooring Material Resists Acids, Alkalis

Advantages claimed for new synthetic rubber flooring material are exceptional strength and long life, and high resistance to acids, alkalis, water and other destructive agents. Known as Vulcrete, it is termed easy to apply.

Material dries to a light concrete color, without need for preliminary bonding with wood, metal, concrete, or other common flooring substances. It is recommended particularly for resurfacing and leveling worn or splintered floors, for general patching, waterproofing, or pointing. Material is also claimed to be an effective sound dampener when used over steel plates —*Flash-Stone Co. Inc., Philadelphia* 44.

Circle 119C on Reader Service Card

New Chemicals

Preservative Coating Aids Fruit Canner

Spread out canning operations are reported possible with use of a new type of preservative coating for fruit and vegetables. It consists of a gel of carboxymethyl cellulose as a carrier for cetyltrimethyl ammonium bromide.

Coat is applied as an aqueous emulsoid by spraying or dipping. If sprayed on, the emulsoid forms a film less than one-thousandth of an inch thick when set and dried. Drying takes about 3 hr. at normal temperatures. Film is reported little affected by treated surfaces being in contact with each other. Fruit takes on a slightly polished appearance.

Composition is claimed to be an improvement over other coatings because it merely slows down—does not stop—the metabolic process that continues in untreated fruit for some time after picking. This enables the fruit to "breathe", delaying onset of autoenzymatic decay processes. Further, it is claimed the coating sets up barrier against microorganisms.

Gel is easily removed by washing with water. Reportedly it does not impair the taste of the product when left on. Sampled separately, the gel is bitter to the taste.

Company's chemists are testing various other water soluble cellulose derivatives with other cationically ionized ammonium compounds.—*W. Vale, Chief Chemist, D. W. Bingham & Co. Pty. Ltd., 226 Normanby Road, South Melbourne, Victoria, Australia.*

Circle 119D on Reader Service Card

Insecticide-Paint Mix Is Highly Effective

Recently announced is a "mix-with-paint" insecticide which virtually paints insects away in one application for the life of the paint—normally four yrs.

Easily mixed with all types of interior and exterior paints, the substance brings certain death to all insects within 15 min. to a few hr. yet is completely odorless and non-toxic to humans.

Like paint pigment, the insecticide does not dissolve but is suspended, and does not effect the paint's normal characteristics or color. By actual tests, it has retained its effectiveness for as long as 5 yr.—*Dianol Sales Corp., Allentown, Pa.*

Circle 119E Reader Service Card

In Behalf of Progress . . .

Food Engineering Meets Real Practical Need

Wide acceptance of food engineering among those who develop and operate efficient food plant production lines is testimony to its vitality.

Two factors in particular account for its ready acceptance.

One is the fact that the industry has begun to apply engineering in a big way. One might almost say that it is undergoing an engineering revolution. Principal reason is the critical need for higher productivity and better quality control in this period of steadily rising costs, keen competition and flimsy profit margins which do not yield adequate business capital.

A second factor contributing to the acceptance of food engineering is the fact that the way has been paved by chemical engineering. It is easy to see that food engineering is to the food industry what chemical engineering is to the chemical industry.

Mechanical engineering cannot adequately serve either of these process industries because it does not embrace the special sciences involved. And chemical engineering cannot properly serve the food industry because the food sciences are different from the chemical sciences.

So it is not surprising when practical technical men in the food industry—from Maine to California, and from England to Australia—tell us that food engineering is a good name for that branch of practical technical knowledge now blossoming in the food industry.

Neither is it surprising that an occasional professional engineer or pedagogue argues that food engineering is but a branch of chemical engineering. Half a century ago, some argued loud and long that chemical engineering was a branch of mechanical engineering.

And here is a significant point: The first course in chemical engineering was introduced in 1888, but it was three decades later that American Society of Chemical Engineers determined what constituted an accredited course in chemical engineering.

Obviously, it took quite a while for chemical engineering to reach the stage where there was wide agreement as to exactly what it involved and how it should be taught.

Because the need for food engineering is appreciated by the men responsible for producing uniform-quality foods at a profit, food engineering will make rapid progress. The pressure of practical reality behind it overpowers any academic arguments against it.

It is the responsibility of educators to develop men with the technical knowledge needed by industry. And professional engineers, to be successful, must equip themselves with the know-how needed by employers or clients.

The food industry clearly indicates the need for food engineering by the extent to which it now is being applied. You can find plenty of evidence in any issue of FOOD ENGINEERING.

Yes, the greatest industry of them all is establishing—through the irresistible force of necessity—a new branch of engineering destined to take its place in the big leagues of applied science.

Meat Industry Reflects Renewed Vitality

Everywhere you turn, you see inspiring evidence of the engineering upsurge in the food industry. Such evidence was presented on a mass basis at the recent convention and exhibit held by American Meat Institute.

Most striking were the new machines for giving bellies the pickle needle—for quick cure, more uniform quality and less shrinkage. One installation is reported to have paid for itself in three weeks.

But at least two dozen other innovations were exhibited at the show (see picture report in this issue). And progress was indicated in the papers and talks at the convention. No one could fail to appreciate the significance of the new method of dressing beef on the rail. It saves time and man-hours and eliminates back-breaking labor—all the result of some very ingenious engineering.

Yet, the highlight of the convention was the challenging address by George W. Stark, president of a young packing company which is successfully pursuing success. Mr. Stark pointed out that the industry must grow 13 percent merely to provide the same amount of meat per capita in 1960. And he challenged packers to boost the meat business by 30 percent in the next nine years.

To meet this challenge, packers must do a better job in all departments—from farmer relations to merchandising.

But especially must the industry improve efficiency and increase profits to finance expansion and further step up efficiency.

Mr. Stark urged packers to "take a look into other industries to see if there are methods we may adopt in our business."

Here you not only have progress in being, but a great deal more in the making.

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with RHEEMCOTE drums

Rheemcote shipping containers are also **selling containers!** Beautifully lithographed in any colors, any design, they promote your product and name wherever they go. Use this powerful new advertising medium. Write—
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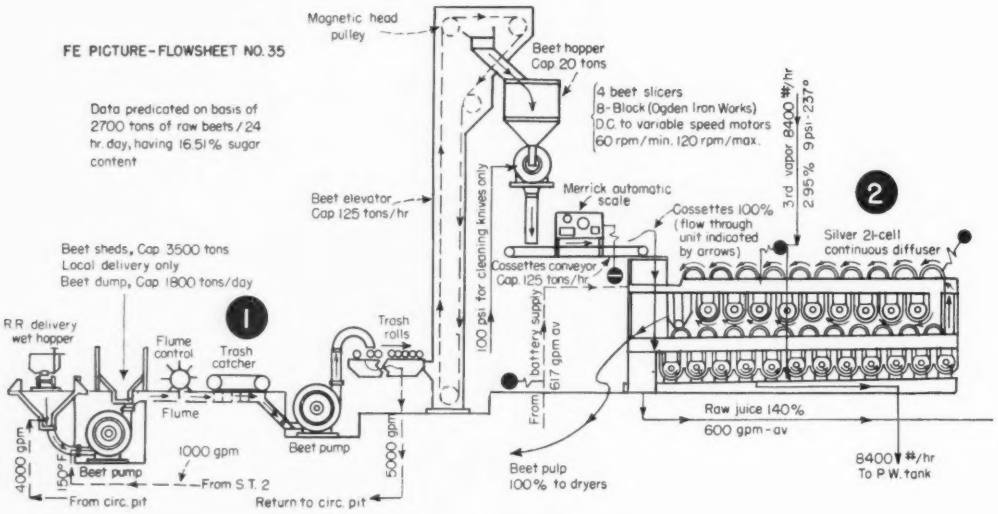
RHEEM

MANUFACTURING COMPANY


FE PICTURE-FLOWSHEET NO. 35
Data predicated on basis of 2700 tons of raw beets / 24 hr. day, having 16.51% sugar content
Magnetic head pulley
Beet hopper Cap 20 tons
4 beet slicers
8-Block (Ogden Iron Works)
D.C. to variable speed motors
60 rpm/min. 120 rpm/max.
3rd vapor 8400 #/hr
2.95% 9 psi 237°
Beet elevator Cap 125 tons/hr
Merrick automatic scale
Cossettes 100% (flow through unit indicated by arrows)
Silver 21-cell continuous diffuser
Beet sheds, Cap 3500 tons
Local delivery only
Beet dump, Cap 1800 tons/day
Cossettes conveyor Cap. 125 tons/hr
100 psi for cleaning knives only
From battery supply 617 gpm av
R.R. delivery wet hopper
Flume control
Trash catcher
Trash rolls
Flume
Raw juice 140%
600 gpm - av
4000 gpm
150° F
Beet pump
1000 gpm
From S.T. 2
5000 gpm
Beet pump
Beet pulp 100% to dryers
8400 #/hr To P.W. tank
From circ. pit
Return to circ. pit

New "Tell-All" Flowsheet

—Graphically Details Advanced Food-Process Engineering. It Shows Efficient Unit Operations, Material and Energy Balance, and Keyed Instrumentation in "Last Word" Beet Sugar Plant

HERE is an unusual five-page FOOD ENGINEERING flowsheet. It not only diagrams efficient unit operations, equipment and flow in the process but also reveals material and energy balances and shows automatic controls by type (see legend).

These plant engineering factors are of utmost importance to food executives and technical men. Two of them—material balance and energy balance—are terms borrowed from the five technical fundamentals of chemical engineering. To define them:

Material Balance: This is a step-by-step quantitative accounting of all materials that go into the process.

Energy Balance: This is similar to the materials balance except that it deals with the energy put into the process. Energy input, of course, is equal to energy output plus the energy utilized in the process.

Holly Sugar Corp.'s Carlton plant near Brawley, Calif., is a "straight" beet sugar factory in which molasses is not Steffenized to recover residual sucrose remaining after processing.

The material balance—easily followed in the accompanying foldout—is predicated on beet cossettes, as comprising 100 percent of raw product entering the diffuser. Thereafter, this percent works down as materials are added, removed, changed in chemical composition, and dehydrated until, on final delivery of the finished, granulated sugar, the end-product figure of 13.42 percent is reached. Besides the sugar there are two other end products—beet pulp, all dried as feed (100 percent), and molasses (5.47 percent).

Maximum capacity of this continuous process is predicated on the production of the 21-cell continuous diffuser, on the basis of this major unit controlling total rate of flow. Accordingly, the factory was designed to extract raw juice from 2,700 tons of beets per 24-hr. day.

Beets are delivered to the plant by rail and truck. Leaving the dumping station—Point 1 in our diagram—they are then ground into cossettes and belt-weighed on their way to the diffuser—Point 2. Juice from this unit is heated, treated with milk-of-lime, then pumped to the first carbonation station—Point 3.

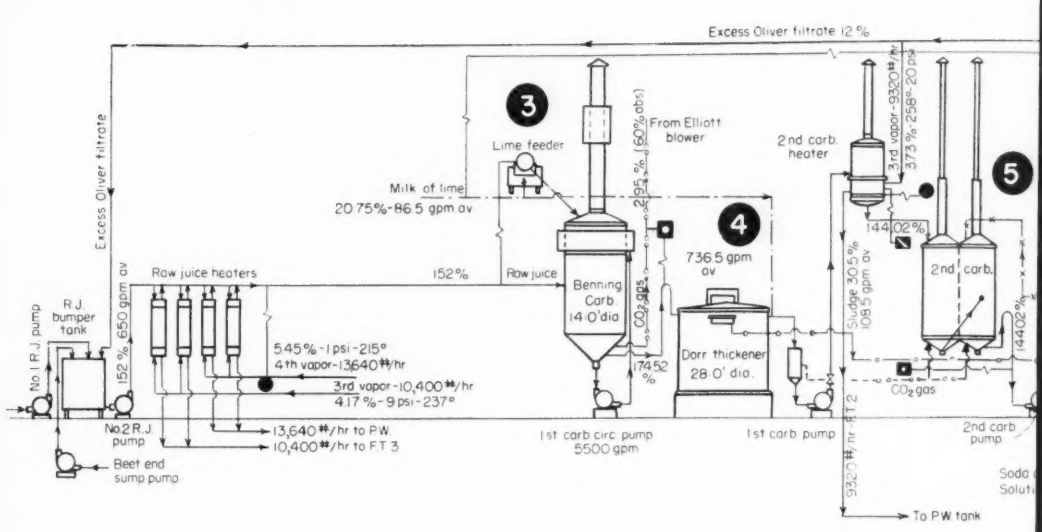
From here, the product is pumped to the thickener—Point 4—where solids are removed. Resulting clarified juice is now pumped to the second carbonation station—Point 5. Then it is passed through plate-and-frame filters. Filtered juice is pumped to the sulfur tower—Point 6. And after heating in a boiler to 98 deg. C., it goes to the evaporators.

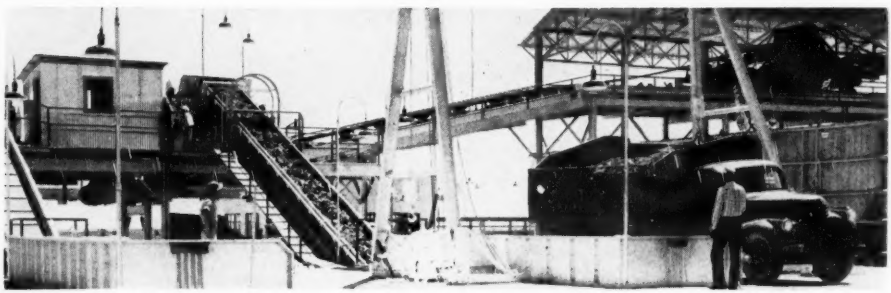
Syrup (thick-juice) from the five-effect evaporator travels to a blending tank, is heated to 96 deg. C., then is drawn by vacuum into pans—Point 7. The finished product of the pans (called "Massecuite") is dropped, when at correct consistency, to the white mixer, then goes to the centrifugals—Point 8.

Wet white sugar from the centrifugals is conveyed by scroll to a surge bin, passed to the granulator, carried by elevator to screens, and finally moves to dry sugar silos.

See Report for Basic Role of 4 Components

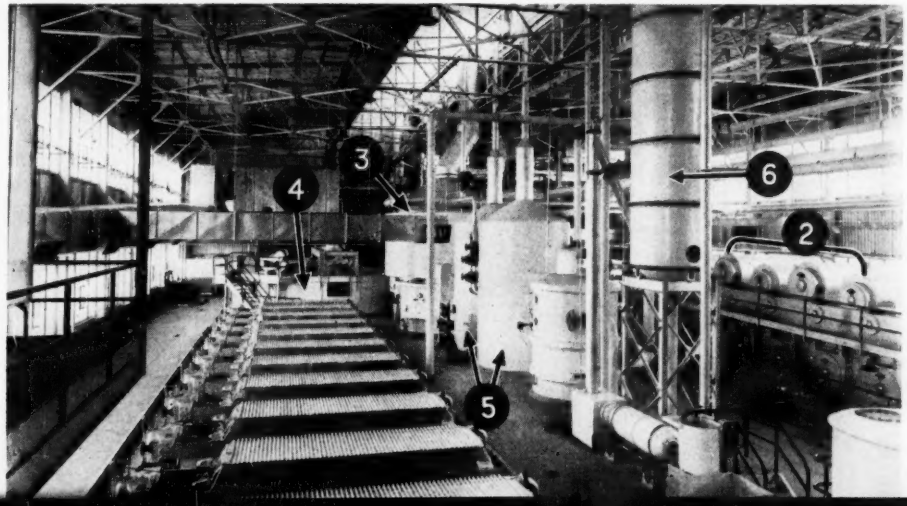
How unit operations, material balance, energy balance, and instrumentation brought top output and efficiency to this modern sugar plant is thoroughly explained in this month's Special Food Engineering Report on pages 93-102.

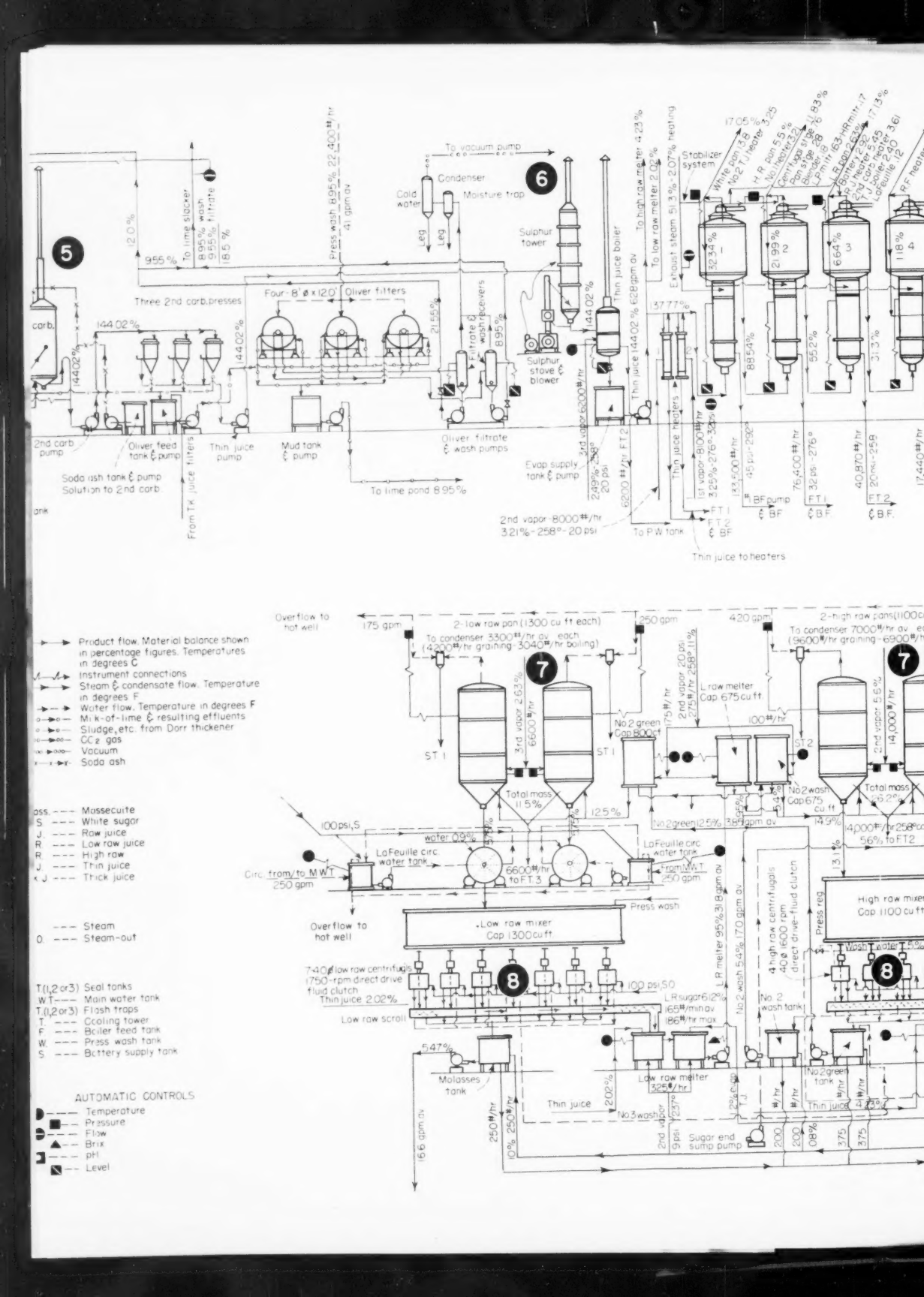


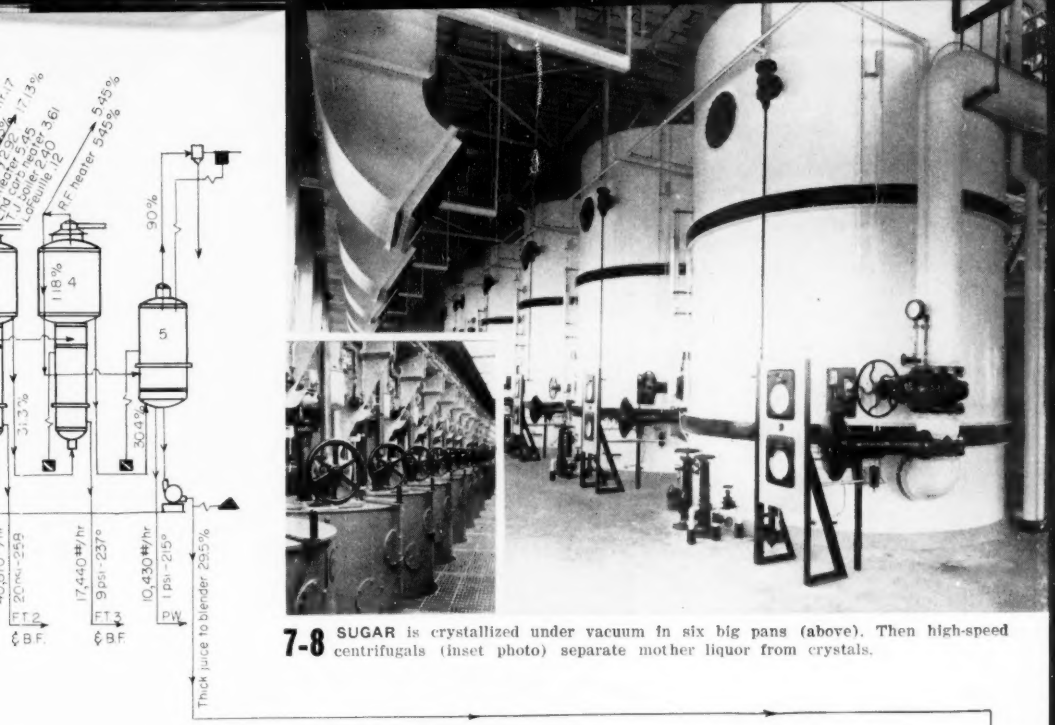


1 **INCOMING BEETS** are dumped from trucks onto conveyors (left) leading to storage sheds (right). Shuttle mover, inside shed, distributes beets evenly to bins.

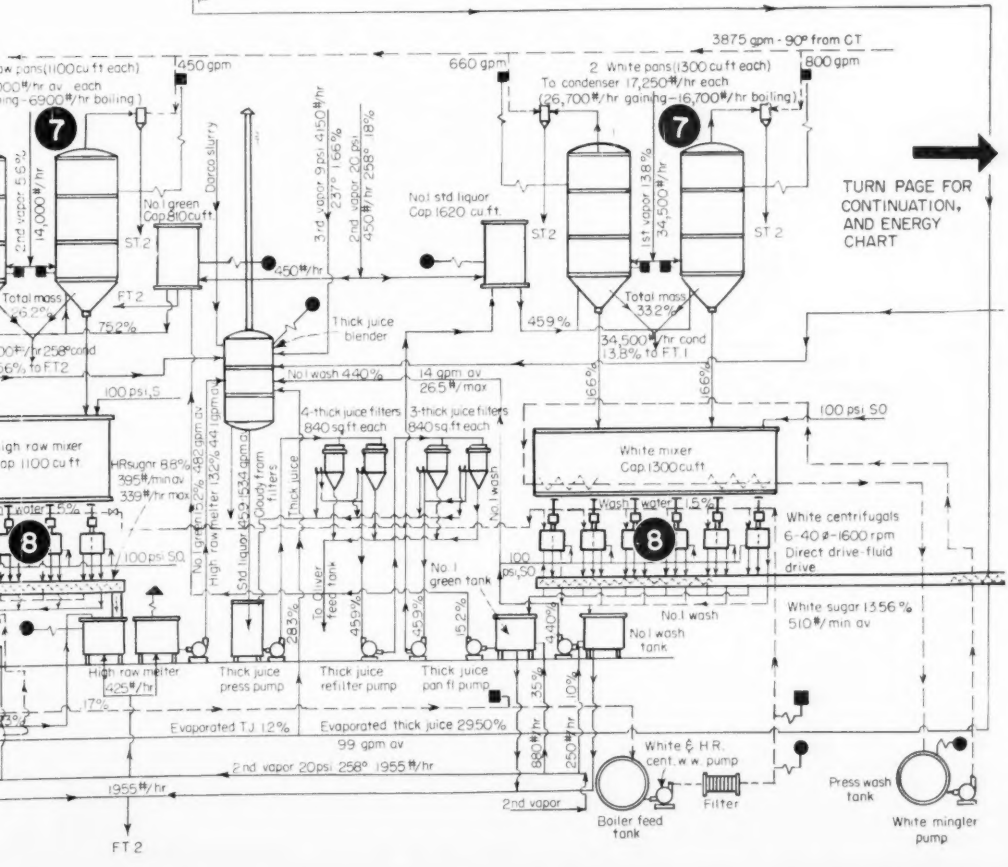
2-6 **OVERALL** view of processing units: Diffuser (2), 1st carbonation (3), thickener (4), 2nd carbonation (5), and sulfur tower (6). At left are filters.

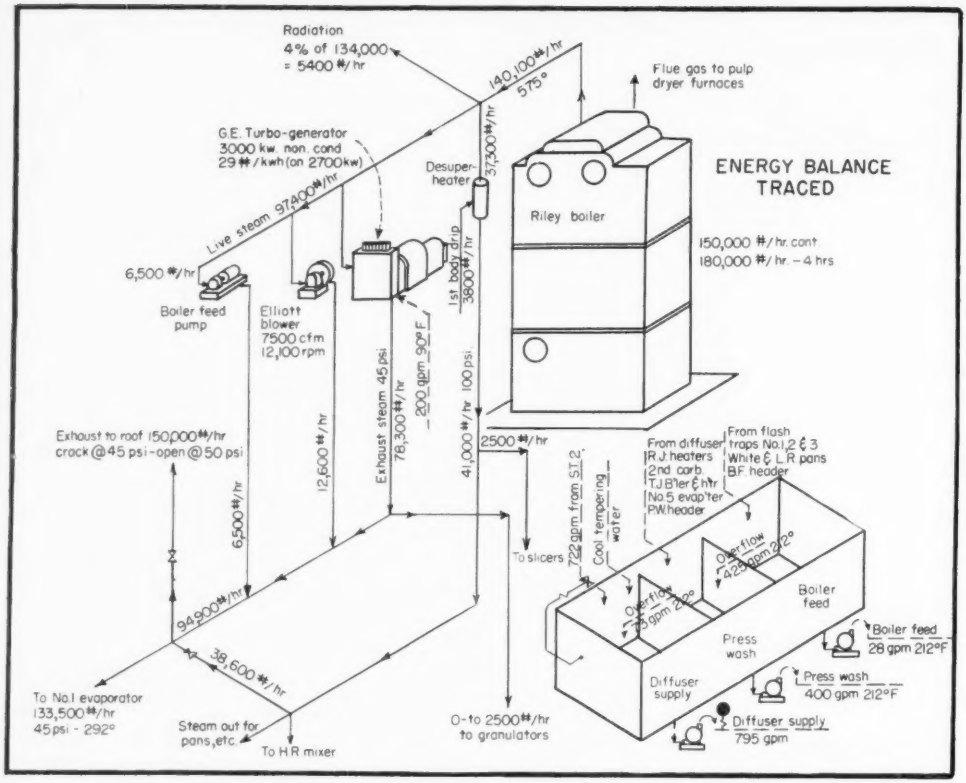


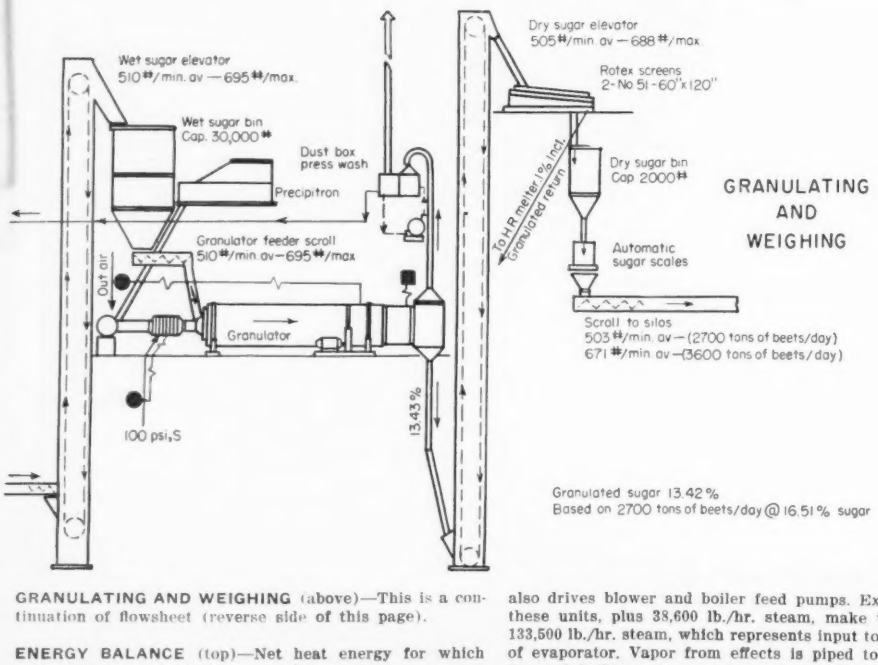

5
6
7
8
Three 2nd carb.presses
Four-8' ø x 12' Oliver filters
Condenser
Moisture trap
Cold water
Leg
Sulphur tower
Sulphur stove & blower
Thin juice boiler
Stabilizer system
Exhaust steam 51.3% - 2.07% heating
To high raw melter 4.23%
To low raw melter 2.02%
To vacuum pump
To lime slacker
Press wash 8.95% 22,400 #/hr
41 gpm av
12.0%
95.5%
8.95% wash
95.5% filtrate
18.5%
carb.
144.02%
2nd carb pump
Oliver feed tank & pump
Thin juice pump
Mud tank & pump
Soda ash tank & pump
Solution to 2nd carb.
From Tk. juice filters
To lime pond 8.95%
Oliver filtrate & wash pumps
Filtrate & wash receivers
21.55%
8.95%
2nd vapor 6200 #/hr
24.9% - 258° - 20 psi
Evap supply tank & pump
6200 #/hr FT 2
Thin juice 144.02% 628 gpm av
Thin juice heaters
1st vapor 8100 #/hr
32.5% - 276° - 32.5
133,500 #/hr
45 psi - 292°
#1 BF pump
FT 1
& BF
75,400 #/hr
32 psi - 276°
FT 2
40,870 #/hr
20 psi - 259
17,440 #/hr
2nd vapor 8000 #/hr
32.1% - 258° - 20 psi
To P.W. tank
Thin juice to heaters
White pan 3.8
No 2 T.J. heater 3.25
H.P. pan 5.5%
No. 1 heater 3.2
Cent. vapor stage 2.6
Pan stage 2.8
Evaporator 2.83%
Lp mix 1.63
H.P. mix 1.7
H.P. pan 2.32
H.P. Boiler 2.32
No. 2 T.J. heater 3.6
No. 1 T.J. heater 5.45
Low grade 2.40
Lafeuille 1.2
R.F. heater
17.05%
17.13%
32.34%
21.99%
16.64%
11.8%
37.77%
88.54%
55.2%
31.3%
Overflow to hot well
175 gpm
2-low raw pan (1300 cu ft each)
To condenser 3300 #/hr av. each
(4200 #/hr graining - 3040 #/hr boiling)
250 gpm
420 gpm
2-high raw pans (1100 cu
To condenser 7000 #/hr av. ea
(9600 #/hr graining - 6900 #/h
3rd vapor 2.63%
6600 #/hr
ST 1
Total mass 11.5%
12.5%
No 2 green Cap 800 ct
L raw melter Cap 675 cu ft
100 #/hr
2nd vapor 20 psi
275 #/hr 258° 11%
ST 2
No 2 wash Cap 675 cu ft
14,000 #/hr
2nd vapor 5.6%
Total mass 6.2%
14.9%
14,000 #/hr 258° av
56% to FT 2
100 psi, S
water 0.9%
LaFeuille circ. water tank
6600 #/hr to FT 3
Circ. from/to M.W.T. 250 gpm
From M.W.T. 250 gpm
No 2 green 12.5% 38 gpm av
LaFeuille circ. water tank
Press wash
Overflow to hot well
Low raw mixer Cap 1300 cu ft
High raw mixer Cap 1100 cu ft
7-40" low raw centrifugals 1750-rpm direct drive fluid clutch
Thin juice 2.02%
Low raw scroll
100 psi, S
LR melter 95% 31.8 gpm av
No 2 wash 5.4% 17.0 gpm av
4 high raw centrifugals 40" ø 600 rpm direct drive-fluid clutch
Press req.
Wash water T 5%
LR sugar 61.2%
165 #/min av
186 #/hr max
No. 2 wash tank
5.47%
Molasses tank
Low raw melter
325 #/hr
No 2 green tank
Thin juice
2.02%
No 3 wash
2nd vapor
9 psi
Sugar end sump pump
16.6 gpm av
250 #/hr
10% 250 #/hr
Product flow. Material balance shown in percentage figures. Temperatures in degrees C
Instrument connections
Steam & condensate flow. Temperature in degrees F
Water flow. Temperature in degrees F
Milk-of-lime & resulting effluents
Sludge, etc. from Dorr thickener
CO2 gas
Vacuum
Soda ash
Massecuite
White sugar
Raw juice
Low raw juice
High raw
Thin juice
Thick juice
Steam
Steam-out
T.(1,2 or 3) Seal tanks
W.T. Main water tank
T.(1,2 or 3) Flash traps
T. Cooling tower
F. Boiler feed tank
W. Press wash tank
S. Battery supply tank
AUTOMATIC CONTROLS
Temperature
Pressure
Flow
Brix
pH
Level



7-8 **SUGAR** is crystallized under vacuum in six big pans (above). Then high-speed centrifugals (inset photo) separate mother liquor from crystals.







GRANULATING AND WEIGHING (above)—This is a continuation of flowsheet (reverse side of this page).

ENERGY BALANCE (top)—Net heat energy for which process is accountable is recorded here. Turbo-generator is powered by live steam direct from boiler. Live steam also drives blower and boiler feed pumps. Exhausts from these units, plus 38,600 lb./hr. steam, make up available 133,500 lb./hr. steam, which represents input to No. 1 effect of evaporator. Vapor from effects is piped to other heating and boiling unit operations. On flowsheet energy percentages are listed above each evaporator effect depicted.

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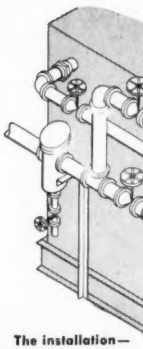

The installation—
Ferro Chemical Corp.,
Bedford, Ohio

PROBLEM: To
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WORKING CO
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SOLUTION TO
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RESULT: For m
with no more
960 Regulato
ing like new,
it will virtuall
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**Another typica
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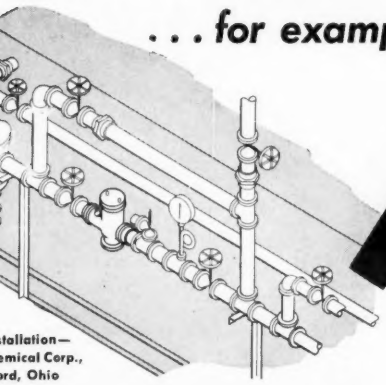
CR

VALVES

FOOD ENGINE

or outstanding service

n Steam to Drying Ovens . . . for example



tallation—
emical Corp.,
rd, Ohio

BLEM: To maintain automatically, within e limits, uniform reduced steam pressure n supply line to battery of two drying ovens trolled by individual thermostatic valves.

RKING CONDITIONS: Initial steam pressure 0 psi to be reduced to 13 psi, and maintained hout significant fluctuation whether one, , or neither of the ovens is being operated.

UTION TO PROBLEM: One No. 960 Crane Brass ssure Regulator, properly selected for capacity re- ed, and with adequate condensate drainage provided.

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other typical case history, demonstrating the bigger value lower ultimate cost of Crane Quality Valves. And why . . . ore CRANE VALVES are used than any other make!

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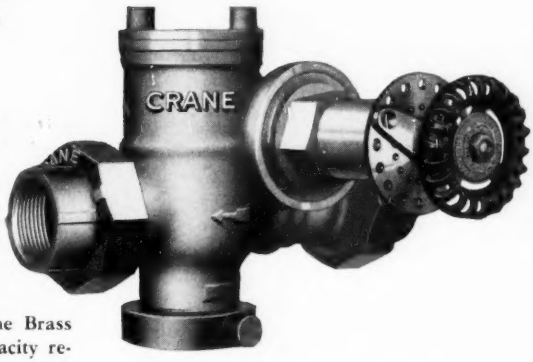

No. 960 Crane Brass Pressure Regulator for steam or air. Literature on request through your Crane Branch or Crane Wholesaler.

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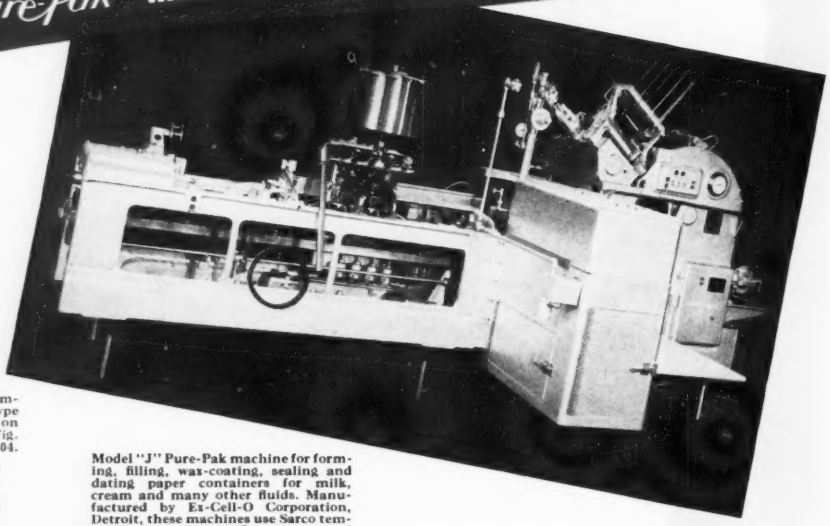
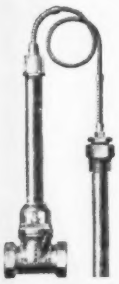
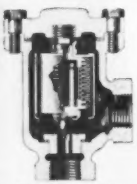
make and fill ten million *Pure-Pak** milk containers a day...



Model "J" Pure-Pak machine for forming, filling, wax-coating, sealing and dating paper containers for milk, cream and many other fluids. Manufactured by Ex-Cell-O Corporation, Detroit, these machines use Sarco temperature regulators, float traps, and strainers.



Sarco self-operated Temperature Regulator, type TR-19, is standard on these machines. See Fig. 1 below. Catalog No. 604.



Sarco Thermostatic Steam Trap, type 9-125 keeps steam jacket around wax tank free from air and condensate. High capacity in small space also used on preheater and line drips. Bulletin No. 255.

Regulator and trap valves are kept free of dirt and scale by Sarco Strainers. Bulletin 1201.

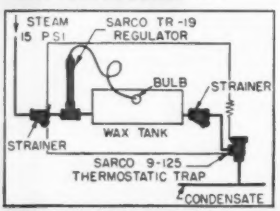


Fig. 1—A special Sarco TR-19 temperature regulator on the steam supply, working with a Sarco No. 9-125 thermostatic trap on the condensate discharge from the jacket, assure wax at just the right temperature.

* "Pure-Pak" is the registered trade-mark of Ex-Cell-O Corporation.

Sarco float-thermostatic trap assures a continuous supply of absolutely dry steam to the defoamer nozzle. See Fig. 2 below. Bulletin No. 452.

Sarco's contribution to this outstanding achievement is to provide *the right combination* of steam trapping and temperature control to assure smooth, automatic operation at top efficiency. If your process involves a heating or cooling problem, Sarco can help you.

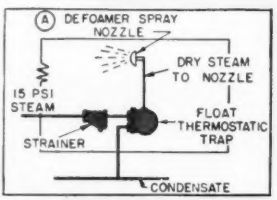


Fig. 2—A Sarco FTL-O float-thermostatic steam trap guarantees dry steam to the defoamer nozzle.

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Will Defense Production Be Caught in the Squeeze?

When Congress revised and extended the Defense Production Act, it relaxed a squeeze on business profits.

President Truman asserted that this action by Congress cripples the government in its effort to prevent inflation which, as he puts it, could lead to "enrichment and profiteering for the few, economic hardship and misery for the many."

He asked Congress to rescind its action.

This editorial—the second on problems presented by "escalator"clauses—aims to throw some light on this conflict of opinion.

The Squeeze

The squeeze on profits was imposed in the name of price stabilization. The idea behind it was simple. The *selling prices* of industrial products were to be held under a tight lid. But many industrial costs are affected by "escalator" clauses of one kind or another which tend to boost production *costs*. Thus, with rising costs and fixed prices, profits would be squeezed and much of the cost of defense would thereby be shifted from those favored by escalator clauses to business concerns.

The mechanics of this squeeze on profits were complicated. But here, in brief, is how it was to work. The first step was to require manufacturers to set ceiling prices, effective May 28, for their products.

These ceiling or maximum prices were to allow for increases in manufacturers' costs that had occurred since Korea. *But they did not allow for all increases.* Manufacturers, for example, could not include increases in indirect costs—office or selling costs. Neither could they, in calculating their new prices, include increases in the costs of materials or direct labor that had come after March 15. This was the first phase of the squeeze on profits.

The second phase was prepared by **not** putting a ceiling on costs. The Wage Stabilization Board said it could not disturb the operation of "escalator" clauses by which wage rates are geared to the cost of living. Moreover, nothing could be done to curb the operation of the farmers' "escalator" clause, the farm parity arrangement. Under it, the federal government underwrites higher prices for farm products to match increases in the cost of things farmers buy. So this left wages and many materials costs free to rise against a ceiling imposed on the prices of what industry has to sell.

Relief—at a Loss

On two conditions only would the Office of Price Stabilization permit a company to raise its prices and escape this squeeze. One of these was that increased costs had more than wiped out its profits; in other words, that it was operating at a loss. The other condition was

that the industry of which the company is a part was not, as a whole, making "excess profits." That is, the industry, as a whole, could not get price relief if its overall profits before taxes were greater than 85 percent of its average profits during the best three of the four years from 1946 through 1949. Many companies expected that their profits would be cut drastically before they could get through this narrow escape hatch.

When this squeeze on profits was set up, we were told that industry as a whole was reporting record profits. But, it was equally true that wage rates and farm prices also were at record high levels. And it was also true that, under the impact of rising taxes and the dislocations caused by the defense mobilization program, profits actually were on the way down.

Profits — Going Down

By the time Congress acted to relax the squeeze, corporate profits, after taxes, were running at a rate 20 percent lower than they had been six months before. And the clear prospect was that they would continue to decline.

So the issue put up to Congress was simply this. Should business firms stand so much of the brunt of the defense costs while "escalator" clauses continued to exempt organized workers and farmers from paying their share of those costs?

But this question actually is much broader than one of fairness or unfairness alone. One certain effect of such a squeeze on profits would be to undercut the capacity of private industry to install the new plants and equipment needed for our mobilization effort. Today — unlike World War II — private industry is financing almost all of our huge program to expand production. And about two-thirds of the money that has been plowed into the expansion and improvement of our industrial machine since World War II has come out of profits.

In view of all this, Congress decided last summer to relax the pressure on profits. This was done by the controversial Capehart Amendment to the Defense Production Act. This amendment has serious administrative weaknesses. But some measure with the same purpose is needed to maintain profits at a high enough level to finance the huge and continuing expansion of our industrial machine that is now underway.

Basic Issues

As soon as the amendment was enacted, the President asked Congress to revise the law again. The heart of his proposal was to restore to the Administration the powers it used last spring to arrange the squeeze on profits outlined here.

This controversy will continue. There can be no final answer to it as long as we have the economic controls made necessary by mobilization.

But if we look beneath the surface of this technically complicated controversy, we shall see clearly that the basic issues are:

1. Whether we really shall make an effort to distribute fairly the burdens of inflation caused by our defense mobilization —

2. Whether farmers and organized workers should be exempted from these sacrifices by escalator clauses — at the expense of the nation as a whole —

3. Whether profits should be squeezed still more — at the risk of putting a fatal squeeze on the effort of industry to build new plants and install new tools. These new facilities are essential to maintaining American living standards — and they are the heart of our ability to defend ourselves and the rest of the free world.

Americans face no more important economic issues at this time.

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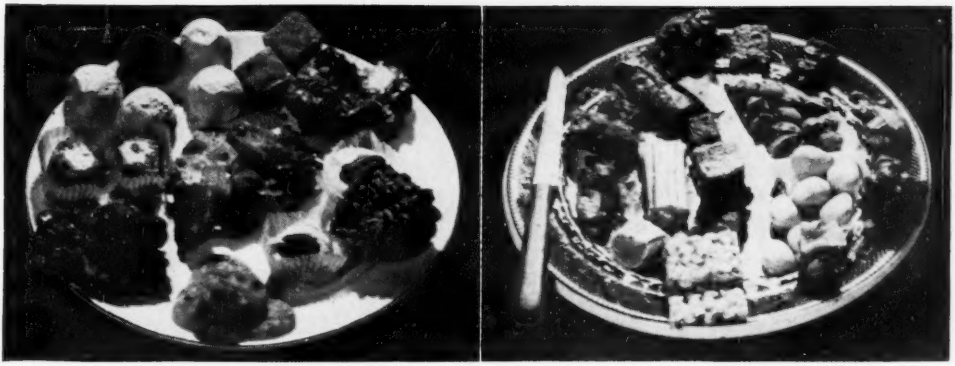


QUALITY of candies is only as good as ingredients going to make them. Left: Pecan candies. Right: Peanut candies.

NUTS: *Better* Kept—*Better* Candy

Storing of nuts under refrigeration preserves color and flavor, effectively retards rancidity, prevents infestation . . . Shelling shortens shelf life

J. G. WOODROOF and S. R. CECIL
Georgia Experiment Station, Experiment, Ga.

Decline in the manufacture and consumption of nut candies in the summer is blamed on the extra difficulty of keeping the nuts free from staleness, rancidity, and insects in the hot months. ■ **Yet there actually is no good reason for this kind of cut-back—since proper storing of nuts and nut candies is a dependable remedy.**

In the making of candies, about 3 billion pounds of agricultural products are used annually. Included among them are 126 million pounds of shelled peanuts, 44 million pounds of shelled almonds, and 14 million pounds of pecan meats.

Estimates from market and manufacturers' reports indicate that 20-25 percent shelled peanuts and pecans and about 60 percent shelled almonds are currently used for all types of edible products.*

Because such large quantities of nuts are used, investigations were launched during the past two years to determine the best way to store peanuts, pecans, and almonds for year-round use. This research was undertaken jointly by the Georgia Experiment Station, National Confectioners' Assn., and The Refrigeration Research Foundation, with these specific objectives:

1. To compare the quality of shelled and unshelled nuts kept under refrigerated and non-refrigerated conditions. Tested were Virginia and Georgia Spanish peanuts, Texas seedling and Georgia Stuart pecans, and California almonds.

2. To determine any variations in the quality of raw nuts and of the nuts as used in candies.

How Tests Were Conducted

Freshly harvested nuts were shipped to Experiment, Ga., and put under test in the late Fall. Stored in a dry seed barn, they were protected from insects by fumigating with a 9:1 mixture of carbon dioxide and ethylene oxide. Fumigation was at the rate of 20-25 lb. of the gaseous mixture per 1,000 cu. ft. for 24 hr. at 70 deg. F. As a further safeguard, the nuts were sealed in multi-wall, asphalt-lined paper bags.

Nuts were shelled under semi-commercial conditions. For test purposes, half of them were shelled prior to storage and the remainder after removal from storage. A commercial warehouse was employed for storing some of the nuts under refrigeration. Temperature of the warehouse was maintained at 36 deg. F. and the relative humidity held at 65-70 percent.

Then at a commercial plant, candy was prepared in 20-lb. batches in the following manner:

First, 7 lb. of sugar, 3 lb. of corn syrup, 1 gal. of water, and 1½ oz. of salt were boiled to 240 deg. F. with constant stirring. Next, 10 lb. of nuts were added and boiling was continued until candy dropped into cold water crystallized. Then, ½ oz. of soda was introduced and the batch was spread on a greased slab coated with starch.

One minute later, the batch was turned and again spread over the slab. And after another minute, the candy was cooled on a belt for 5 min. and then packed and sealed in 1-lb. tins.

It took about 5 min. to cook the candy and the same amount of time for the almonds and pecan meats. About 15 min. were required to cook the peanuts. Consequently, it was necessary to dry-roast the peanuts for two-thirds the usual time before adding them to the candy.

Prepared were 52 batches of candy, consisting of 1,000 lb. of pecan, peanut, and almond-type confections.

Within two weeks, about 100 representatives of the confectionery and refrigeration industries evaluated the candies on the basis of aroma, flavor, and texture.

Almonds were scored raw and then rated in candies after 17 and 31 weeks of storage. Pecans were scored raw after 13, 18, 22, 26, 33, 45, and 57

* Anon. *Almond Facts*, Nov.-Dec. '50; Anon, *Peanut Stocks and Processing*, Bureau of Agricultural Economics, July 24, '51.

weeks of storage and also made into candies after 18, 33, and 57 weeks of storage. Peanuts were scored raw after 17, 25, 29, 33, 40, 52, and 64 weeks of storage and added to candies after 25, 40, and 64 weeks of storage.

Chemical Evaluation

Nuts, both raw and those used in candies, were analyzed for free fatty acid, peroxide values, and moisture content after 8 and 12 months of storage. Chemical results (Table III) are far less significant than the organoleptic scores (Table I). It was evident that evaluations on the basis of odor and flavor were more indicative of the edible quality of the nuts than data on free fatty acid and peroxide values.

Moisture content of the nuts varied. It was highest for shelled refrigerated nuts; slightly less for unshelled, refrigerated nuts; and lowest for shelled and unshelled nuts held in common storage.

The variety of nuts markedly influenced the amount of moisture retained. For example, when stored under similar conditions for 8 months, the moisture contents were 4.51 percent for Stuart pecans, 4.19 for Texas seedlings, 7.63 percent for Spanish peanuts, 7.25 percent for Virginia peanuts, and 5.69 percent for almonds.

Shelled vs. Unshelled

Refrigerated, unshelled, peanuts, pecans, and almonds were judged excellent after 31, 57, and 64 weeks, as shown in Fig. 2. Refrigerated, shelled peanuts dropped in quality—from excellent to very good after the 18th week. The quality of shelled, refrigerated pecans fell from excellent to very good after the 13th week. All of the shelled, refrigerated peanuts and pecans remained very good during the subsequent storage.

Unshelled peanuts held in common storage fell from excellent to very good quality after the 13th week, while a similar change took place with unshelled pecans after 16 weeks. Both peanuts and pecans then remained very good for a year.

Shelled peanuts in common storage were judged very good after 14½ weeks, good after 29 weeks, and remained the same for the remainder of the year.

The quality of shelled pecans held in common storage declined quite rapidly. It fell from excellent to very good in 11½ weeks, good in 18 weeks, poor in 30½ weeks, to very poor in 52 weeks.

For year-round consumption, data in Fig. 3 show that refrigerated, unshelled peanuts and pecans (curves A) were superior to all other nuts. The quality of unshelled nuts in common storage (curves D) dropped quite rapidly. And the keeping quality of

Pecan and Peanuts Compared

TABLE I—EFFECT of Refrigeration on Quality of Shelled and Unshelled Pecans and Peanuts After 14 Months' Storage

Treatment	Raw Nuts			Nuts in Candies		
	Color	Aroma	Flavor	Color	Aroma	Flavor
Stuart Pecans						
Refrigerated						
Unshelled	1.4*	1.6	1.4	2.7	1.8	2.2
Shelled	2.1	2.4	2.2	3.0	2.1	2.3
Unrefrigerated						
Unshelled	3.0	2.9	3.5	3.0	2.2	2.6
Shelled	4.0	4.1	5.0	3.7	3.8	4.4
Seedling Pecans						
Refrigerated						
Unshelled	1.2	1.4	1.5	2.7	2.0	2.3
Shelled	2.1	2.1	2.3	2.6	1.7	1.8
Unrefrigerated						
Unshelled	1.8	2.3	2.3	2.7	2.1	2.2
Shelled	4.0	3.7	4.6	3.5	2.8	3.2
Spanish Peanuts						
Refrigerated						
Unshelled	1.3	1.8	1.5	2.1	1.6	1.7
Shelled	2.3	2.2	2.5	2.1	1.7	1.7
Unrefrigerated						
Unshelled	2.4	3.4	2.5	3.0	2.2	2.2
Shelled	3.5	3.1	3.4	3.1	2.2	2.4
Virginia Peanuts						
Refrigerated						
Unshelled	1.7	1.7	1.8	3.3	2.4	2.6
Shelled	2.4	2.3	2.1	2.9	2.2	2.3
Unrefrigerated						
Unshelled	3.1	2.8	3.3	3.3	2.3	2.4
Shelled	3.9	3.7	3.1	3.3	2.5	2.9

* Samples were rated: 1, excellent; 2, very good; 3, good; 4, poor; and 5, very poor.

TABLE II—NUMBER OF WEEKS Shelled and Unshelled Nuts Remained at the Different Quality Ratings When Stored Under Refrigerated and Unrefrigerated Conditions

Condition of Storage	Excellent	Very Good or Better	Good or Better	Poor or Better	Very Poor
Stuart Pecans					
Refrigerated					
Unshelled	57+	....	....	....	....
Shelled	13	57	....	....	....
Unrefrigerated					
Unshelled	26	57+	....	....	....
Shelled	12	25	30	55	57
Texas Seedling Pecans					
Refrigerated					
Unshelled	57+	....	....	....	....
Shelled	13	57	....	....	....
Unrefrigerated					
Unshelled	30	57+	....	....	....
Shelled	15	25	40	57	....
Georgia Spanish Peanuts					
Refrigerated					
Unshelled	64+	....	....	....	....
Shelled	25	64+	....	....	....
Unrefrigerated					
Unshelled	40	64+	....	....	....
Shelled	21	32	64	....	....
Virginia Peanuts					
Refrigerated					
Unshelled	64+	....	....	....	....
Shelled	18	64+	....	....	....
Unrefrigerated					
Unshelled	30	64+	....	....	....
Shelled	22	34	....	....	....
Almonds					
Refrigerated					
Unshelled	30	31+	....	....	....
Unrefrigerated					
Unshelled	20	31+	....	....	....

Note: Almonds were tested for 31 weeks, pecans for 57 weeks, and peanuts for 64 weeks.

TABLE III—DATA Show Free Fatty Acid, Peroxide Number, and Moisture Content of Shelled and Unshelled Pecans, Peanuts, and Almonds Held in Refrigerated and Common Storage for 8 Months

	Free Fatty Acid as Oleic (Percent)	Peroxide Number (Millimols of O_2 per Kg. of Oil)	Moisture (Percent)
Stuart Pecans			
Refrigerated			
Unshelled	0.53	5.4	5.26
Shelled	0.41	3.6	4.37
Unrefrigerated			
Unshelled	0.73	3.6	4.41
Shelled	0.42	2.9	3.81

TABLE III (Continued)

	Free Fatty Acid as Oleic (Percent)	Peroxide Number (Millimols of O_2 per Kg. of Oil)	Moisture (Percent)
Seedling Pecans			
Refrigerated			
Unshelled	0.65	3.8	4.91
Shelled	0.57	4.2	3.91
Unrefrigerated			
Unshelled	0.41	2.0	4.57
Shelled	0.49	3.9	3.37
Spanish Peanuts			
Refrigerated			
Unshelled	0.47	3.4	8.31
Shelled	0.75	5.4	8.59
Unrefrigerated			
Unshelled	0.51	1.9	6.55
Shelled	0.74	3.0	7.09
Virginia Peanuts			
Refrigerated			
Unshelled	0.48	2.8	7.42
Shelled	0.56	4.1	8.00
Unrefrigerated			
Unshelled	0.57	2.9	6.63
Shelled	0.75	2.5	6.98
Almonds			
Refrigerated, Unshelled	0.35	2.8	5.87
Unrefrigerated, Unshelled	0.42	2.7	5.52

shelled, refrigerated nuts (curve B) and unshelled, unrefrigerated nuts (curves C) were about the same.

By comparing curves (C) and (D) for pecans, it is apparent that staleness in shelled, refrigerated nuts occurred quite rapidly for the first few weeks but soon leveled off so that there was little change after 25 weeks of storage. However, staling in unshelled nuts held in common storage was gradual.

Raw Pecans Best

Quality of pecans was judged higher in the raw state than after it went into candies in 7 of the 12 lots (see Fig. 1). In two lots the scores averaged the same. And in the remaining three lots, the quality of the nuts was judged better in candies than in the raw state. Reason: The sweetness of the candy masked stale, rancid, or other objectionable flavors.

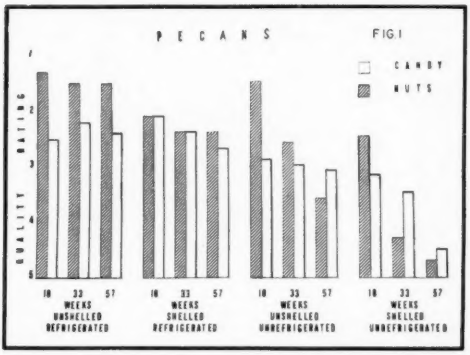
After 18 weeks, raw pecans scored higher than those used in candies, irrespective of how they were stored. Then, after 33 weeks, all except the shelled, unrefrigerated pecans scored higher in the raw state. The unrefrigerated pecans scored higher in the raw state after 57 weeks of storage, and those refrigerated scored higher in candies. Thus, the poorer the quality of the nuts, the more pronounced was the masking effect of the sugar in the candy.

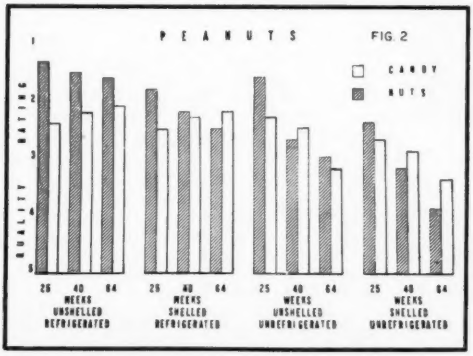
Stored peanuts showed about the same trends as pecans, except that they had a longer shelf-life, especially when unrefrigerated. At the end of 25 weeks, all of the peanuts scored higher in the raw state than in candies. After 40 weeks, refrigerated raw peanuts scored higher in the candy. Shelled peanuts rated higher in the raw state after 64 weeks, and those that were not shelled were judged as of higher grade in candies.

As was the case with pecans, the poorer the quality of the peanuts the

(*Turn to page* 148)

Best Practice Is Storage Under Refrigeration





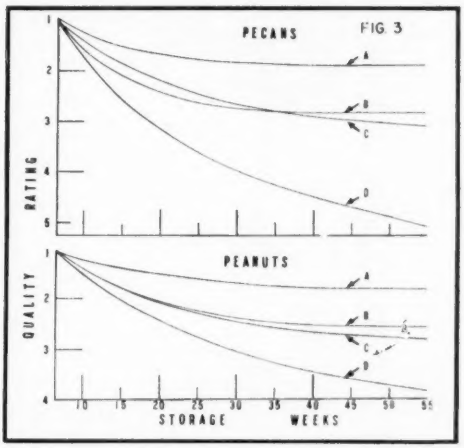


FIG. 1—Refrigerated pecans and pecan-candies rated highest. Unshelled pecans held up better during storage than shelled nuts. Quality of nuts in candies was superior to raw pecans held 33 and 57 weeks without refrigeration.

FIG. 2—Peanuts stored better when kept under refrigeration and also when they were not shelled. Peanuts in candies rated higher than shelled nuts unrefrigerated for 40 weeks.

FIG. 3—Effect of storage on quality of pecans and peanuts. Curves denote following treatment: A—Unshelled, refrigerated; B—Shelled, refrigerated; C—Unshelled, unrefrigerated; and D—Shelled, unrefrigerated.

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In many processes pH has a marked effect on the product. When automatically controlled, time, money and materials are saved, and a more uniform quality product results.

In plant water treatment, for example, the control of pH at very definite values is almost an absolute necessity for proper operation of coagulation, neutralization, softening, and ion exchange processes.

In sugar refining, automatic regulation of liming of raw cane juice maintains pH at the value that produces proper clarification.

In manufacturing gelatine, pH must be carefully controlled to obtain a product with the desired solubility, viscosity, clarity, and jelly strength.

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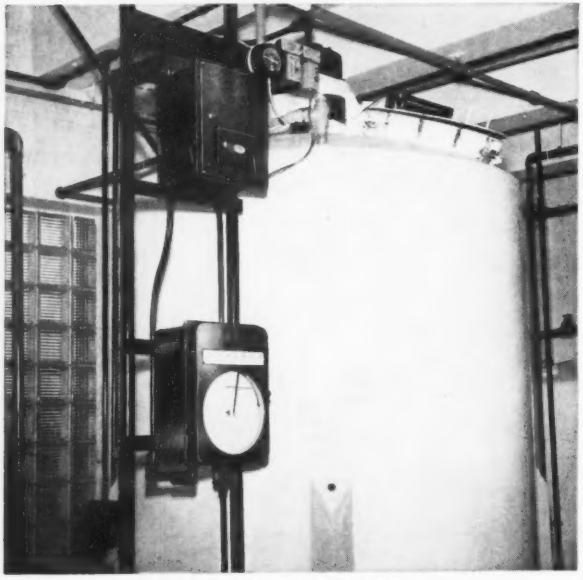
Write for bulletins covering pH instruments and the other Bristol Food Plant Instruments listed to the right. THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 20, Conn.



Typical installation of Bristol pH Instruments

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Let's Force Factories To Purify All Smoke, State Senator Urges
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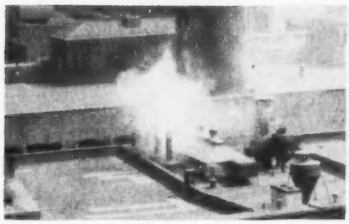


Engineering does it

CINDER ELLA—the N. Y. World-Telegram's mannequin used to impress New Yorkers with the seriousness of their smoke problem. Billions of grime particles were deposited daily on her clean clothing when she stood at some busy corners.

Is *Your* Smoke Showing?

If so, you might well follow the example of foresighted Gotham coffee packer—who switched to smokeless roasters

DRASTICALLY reduce smoke or pay a penalty! That is the order of the day confronting urban processors. For smoke's menace to public health as well as its costly nuisance factors are arousing people to wage a fight against air pollution.

Compliance will be mandatory in those many sectors where processors seek to take advantage of proximity to markets, rapid distribution channels, or port facilities.

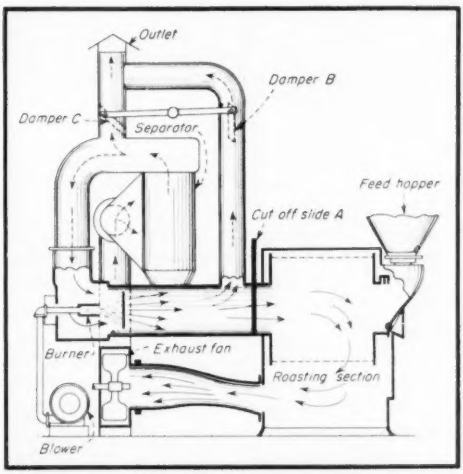
The coffee companies particularly fall in this category. And here the example set by Joseph Martinson & Co. of N. Y. is in point. This organization, having read the handwriting on the wall, was the first to install smokeless coffee roasters. The units were designed and installed by Jabez Burns & Sons. They completely burn the smoky mixture of oils, chaff, and other organics by recycling them through the burner. Fuel costs, however, are increased.

The 3-period batch operation in the smokeless roasters (see drawing, right) may be summarized as follows:

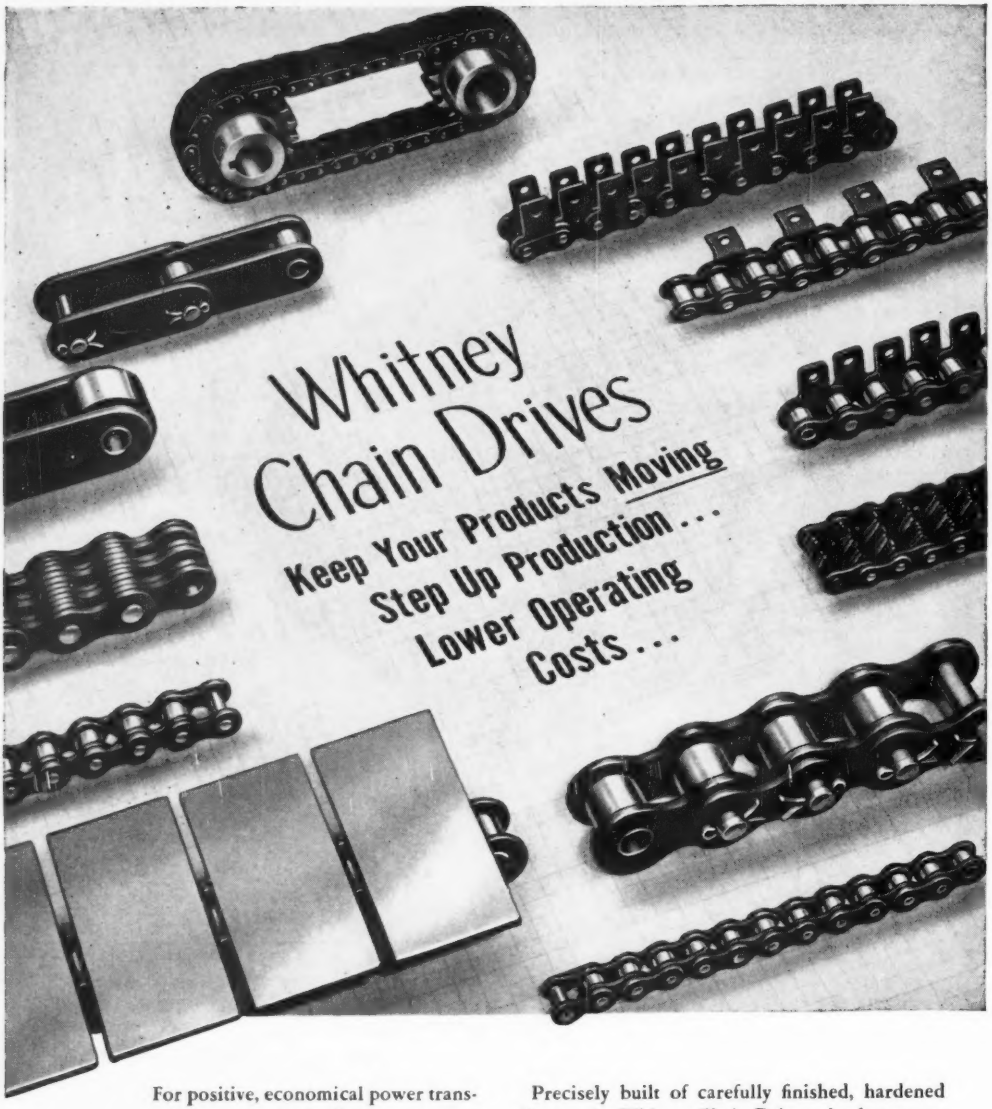
Period 1 (preheating, normally smokeless): Damper (C) open and damper (B) closed. Cut-off slide (A) opens to allow hot gases into roaster section.

Period 2 (roasting): Damper (B) open with (C) closed to force excess gases through flame before being exhausted.

Period 3 (water quenching): Cut-off slide (A) shut to prevent return of water vapor. Dampers (B) and (C) as in 2.



How No-Smoke Roaster Works



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ONE OF refrigerated 1½-tonners furnished. Fleet is garaged, maintained, kept bright under long contract.

Buy Trucks—Or *Lease* Them?

This food distributor leased—and declares it has thus saved considerable capital for product operations, at the same time avoiding the many costly headaches of "being in the auto maintenance business"

QUESTION facing the Chicago Frozen Food Co. was, "Shall we purchase a new truck fleet, or shall we hire the service?" After weighing the many factors, the decision was to lease 24 route trucks from the Willett Co., of the same city.

■ **As a result, the food concern now points to a sizable saving of money for use in product operations—the $50,000 to $75,000 that would have been required for buying new vehicles. In addition, it has unburdened itself of numerous expensive and complicated truck-maintenance responsibilities.**

Chicago Frozen Food had been distributing a comprehensive line of products with its own fleet of trucks since 1937. The company maintained its own garage with mechanics, also repair shop and parts stockroom, and storage facilities for gasoline, oil and tires. With these it had provided a reliable delivery service.

But as the fleet grew older, the question of replacement and modernization arose. And this led to the leasing. The food company states that the new arrangement has been found far less troublesome than owning and maintaining its own fleet.

No Garage Overhead

Under the leasing arrangement the company disposed of its garage and maintenance crew and streamlined its operations with fewer employees. Now it has only office and sales personnel, including the driver salesmen.

The company routes and dispatches the trucks, but the latter are stored overnight at the Willett garage nearest to the company's place of business. The driver-salesmen also check in at night at the Willett garage. The company hires, pays, and directs the driver-salesmen, while Willett supplies everything else required in the delivery operation.

The leasing arrangement is of the usual type, supplying a contracted number of trucks and bodies that are built, painted and lettered to the food company's specifications and that are to be kept in good mechanical condition and appearance over the period of years of the lease. For this service Willett charges so much per truck per week for a given number of miles run, with a plus charge for each additional mile over and above the agreed normal mileage.

All trucks supplied are of one rated capacity, with panel bodies built to carry a 3,000 lb. payload of the frozen food products. The makes of trucks furnished include Diamond T's and Fords.

All trucks are equipped with both insulated and refrigerated bodies capable of maintaining an interior body temperature as low as —5 deg. F. Fiberglas insulation of 6 in. thickness is used in the front, rear, sides and floor, while 7 in. of this material is employed in the roof.

The bodies are equipped with mechanical refrigeration with Dole hold-over plates. By means of electric plug-in connections, these plates are recharged each night while the trucks are in the garage. When they are ready for their loads the following morning, interior body temperature is —5 deg. F. or below.

The truck body is painted in a two-color design, the upper panels being a cream color and the lower panels blue.

(*Turn to page* 176)

Walworth manufactures a *complete line* of Gate, Globe, Angle, Check, and Lubricated Plug Valves, made of Stainless Steel, Steel, Iron, Bronze, and Special Alloys in a wide range of sizes and temperature-pressure ratings.

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CMP TIGHTENS SQUEEZE

Food processors face tough times in obtaining scarce materials for equipment and construction. Here are the facts. Also suggestions to help you get what you need

FOR THE PAST YEAR we have been merely in the tooling up phase of defense production. And even such heavy materials requirements as those of the fourth quarter will be rated small once industry is ready for the maximum effort. This will come well along in 1952.

Until then, critical materials can continue to support a civilian economy at a fairly high level. As time goes on, however, increasingly larger amounts will be siphoned off for defense and defense-supporting industries. Today, it is conservatively estimated that 57 percent of steel capacity is already going to these industries.

Is food rated as a defense-support-industry? The answer cannot be an unequivocal "yes," because there are many products and segments of the food industry which are not rated essential.

Here is the latest criterion being followed by the U. S. Department of Agriculture's Office of Materials & Facilities (OMF). Critical materials are allotted only where the products or services are basically important to the nation's food program and where existing facilities are clearly inadequate to meet recognized food program requirements.

A processor will have to think twice about some of his products and lay plans to conform as nearly as possible to the overall food program if shortages of critical materials might affect his future operations. Individual hardship no longer is rated as a very important reason for allotting critical materials.

Thus far, food processors have fared exceptionally well under the Controlled Materials Plan. But from here on, the situation will be different. Previously, few manufacturers have

TABLE I—APPROXIMATE ALLOTMENTS to Manufacturers of Food Processing Machinery

	Carbon Steel	Alloy Steel	Stainless Steel	Copper & Brass Mill Prod.	Copper & Brass Foundry Prod.	Copper Wire Mill Prod.	Aluminum Prod.
Est. requirements	100%	100%	100%	100%	100%	100%	100%
Allotted 3rd quarter	80%	84%	77%	78%	76%	83%	82%
Allotted 4th quarter	59%	70%	74%	69%	39%	61%	47%
Est. allotment, 1st quarter of '52*	30%	35%	37%	35%	20%	32%	24%

* Based on 50% allotments of 4th quarter of 1951.

TABLE II—EXPANSION ACTIVITY in Food and Fiber Industries* As Indicated By Applications for 4th Quarter.

Industry	No. Cases	Total Cost	Carbon Steel (Tons)	Copper Materials (Pounds)	Aluminum Materials (Pounds)	Production Equipment
Dairy						
Dry milk Cheese Evap. milk Pharm. prod.	7	$1,139,636	388	10,850	480	$671,570
Ice cream	4	1,572,120	449	15,400	.....	576,258
Fluid milk	16	4,669,866	664	14,720	30,241	1,368,568
Grain						
Baking	25	27,347,297	2,543	354,767	7,774	9,680,705
Milling (flour)	2	603,300	208	4,000	.....	81,000
Milling (feed)	19	19,331,540	1,867	51,387	10,000	2,208,140
Processing and storage	11	1,055,066	337	6,840	.....	338,365
Elevators	47	7,672,205	2,108	55,530	.....	768,730
Beer and alcohol	10	10,230,247	3,198	29,500	.....	160,855
Rice milling	3	1,038,130	506	800	1,500	342,000
Fruits and Vegetables						
Canning and preserving	13	6,847,782	3,255	5,916	500	1,165,000
Freezing	1	185,000	79	6,000	.....	.....
Concentrated juices	1	.....	13	.....	.....	.....
S. S. juices	1	142,080	108	940	.....	28,050
Dehydrated	1	895,000	385	12,400	2,900	.....
Fresh	9	504,170	390	2,219	.....	17,700
Cotton	7	928,445	90	4,559	46,657	100,147
Meats and Livestock	22	17,346,884	4,998	160,617	100	2,834,815
Poultry	13	253,301	1,691	5,394	.....	82,085
Sugar and soft drinks	16	9,421,335	789	43,540	30	.....
Fats and oils	31	37,482,472	11,300	327,810	18,502	.....
Coffee	4	2,540,000	1,000	1,050	.....	220,000
Tobacco	12	12,503,197	2,291	100,700	8,800	4,544,350
Locker plants	2	40,500	17	300	.....	.....
Distribution warehouses						
Manufacturers	13	1,920,949	693	16,250	.....	.....
Wholesalers	19	4,618,828	1,872	22,012	1,200	17,197
Chain stores	17	10,030,293	3,837	54,546	500	335,650
On farm production	16	525,881	243	6,000	3,327	.....
	323	180,845,354	44,619	1,314,049	132,511	25,441,185

* Table covers about two-thirds of the applications made for 4th quarter deliveries of controlled materials for construction projects. Some of these were well advanced and needed a small amount of material for completion. Others were not actually started at time of application. No indication is made whether applications were approved or denied, nor of the amounts of materials actually allotted.

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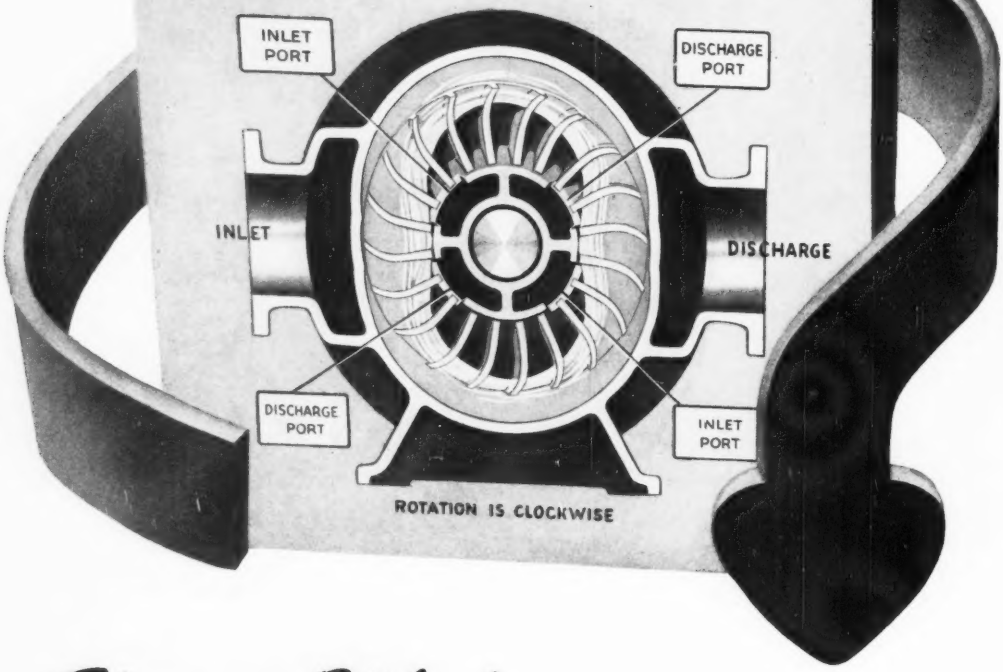

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®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

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had to require defense-order ratings for equipment. Now, defense-rated orders will be necessary, and processors will ask OMF for DO ratings. Agriculture's DO-G3 rating undoubtedly will be used to screen for essentially all food industry expansion and replacement.

On the average, the food processing industries were allotted the following approximate portions of their controlled materials requests for the third quarter: Carbon steel, 80 percent; alloy steel, 84 percent; stainless steel, 77 percent; copper and brass mill products, 76 percent; aluminum, 82 percent.

By mid-October the picture had worsened considerably. So far in the fourth quarter, the following approximate portions of the controlled materials requested on CMP-4B applications have been allocated to manufacturers of food processing equipment: Carbon steel, 59 percent; alloy steel, 70 percent; stainless steel, 74 percent; copper and brass (mill), 69 percent; copper wire (mill), 61 percent; copper and brass (foundry), 39 percent; aluminum, 47 percent.

The amounts of critical materials requested by manufacturers of processing equipment for the fourth quarter are considerably less than requests for construction of processing and warehousing facilities (exclusive of the production equipment).

This is significant. Plants now under construction will be ready for new processing equipment in 1952. Should the Defense Production Administration provide only 50 percent of the fourth quarter 1951 allotments to equipment manufacturers in the first quarter of 1952, the amount of materials available will amount to only 20 to 37 percent of requirements (see Table I). Since the industry estimates 35 percent as MRO requirements, the first quarter 1952 allotment would fail to meet even those requirements.

Obtaining Allotments

Applicants for controlled materials are urged to plan requirements well in advance of needs and to submit applications as much as four months prior to the desired delivery date. If one waits too long, he may be denied allotments for the quarter in which delivery is needed because the claimant agency's allotment may have been depleted.

For those who buy directly from the mills, it is now necessary to order 90 days before the beginning of the calender quarter in which the controlled materials are to be used. This is necessary to assure the placement of orders for such materials on mill schedules. It may be for this reason that your local supplier's shelves are bare, and it is well to try all available suppliers within a reasonable radius before appealing to Washington for help in obtaining allotted materials.

Moreover, allotments obtained late in a quarter may be difficult to fill at warehouses because it is possible that more allotment "tickets" may be placed in a given area than the supply for controlled materials in the area.

Self-Certification

Under Direction 1 of CMP Reg. 6, a person is authorized to self-allot or self-certify for limited quantities of controlled materials. In the case of industrial facilities, this amounts to 25 tons of steel (including 2½ tons of alloy but no stainless), 2,000 lb. of copper and copper-base alloys and 1,000 lb. of aluminum. Thus, for small construction projects, it is not necessary to apply to Washington for controlled materials.

Under CMP Reg. 5, the processor is allowed to make capital additions up to $750. But under Direction 1 to CMP Reg. 6, he is not so limited if controlled materials are necessary to erect or install the equipment. The processor merely uses the U6 allotment for the controlled materials, such as structural steel and copper wire, necessary to install the machine. Then he uses the DO-U6 rating to purchase the machine itself.

This doesn't make sense in view of the Reg. 5 limitation, but the cost of machine is not limited. Although this anomolous situation may be corrected as materials become tighter, the intention is to make small installations flexible.

New Quarter, New Application

Originally, CMP-13, the allotment form, provided the privilege of re-

(*Turn to page* 166)

Construction Questions and Answers

Question—What projects may be classified as construction projects but may not appear to be such?

Answer—Numerous types of projects can be classified as construction, such as; Digging or drilling a well using water-well casing; installing lines and distribution pipes in a permanent irrigation installation; farm or factory fences; initial wiring of a structure already built; rewiring a structure; addition of a piece of production machinery requiring controlled materials for installation; and various parallel interpretations.

Question—How does an applicant obtain processing machinery and equipment for an expansion if controlled materials are not required?

Answer—A claiming agency, such as Agriculture's Production & Marketing Administration, may authorize an applicant's construction schedule and a related DO rating pursuant to an application submitted on Form CMP-4C.

Question—Is there a dollar limit beyond which a person who self-authorizes a construction schedule may not issue DO ratings for processing equipment?

Answer—Not if controlled materials are required for installation. This applies also to DO ratings issued by PMA under conditions described in the second question.

Question—In Direction 1 to CMP Reg. 6, industrial facilities are allowed a far greater amount of controlled materials than commercial facilities. What is the dividing line between the two types of facilities?

Answer—NPA has defined as commercial any facility used in marketing a product. If the facility is used both for processing and marketing, whichever operation is greater determines the classification of the whole.

Question—Should an allotment prove inadequate for any reason, can the recipient obtain additional controlled materials to complete the construction, and how can this be done?

Answer—Yes, the claimant agency can, if it chooses, make supplementary allotments of controlled materials to complete previously authorized construction schedules merely on the basis of a letter explaining the situation and requesting the supplementary allotment required.

Question—Some applicants for construction allotments for the fourth quarter of 1951 were able to obtain all the controlled materials necessary for the construction prior to Oct. 1, 1951. But they also received an allotment for those same materials to be delivered after Oct. 1, 1951. Can the applicant use the latter material?

Answer—No. Any material allotted for a particular construction job in excess of the amounts actually required must be returned, as provided for in CMP Reg. 6.

NOTE: NPA has released a number of interpretations of various controlling regulations in Releases 1102, 1180 and 1266. These may be obtained from State NPA offices or by applying to National Production Authority, Washington, D. C.

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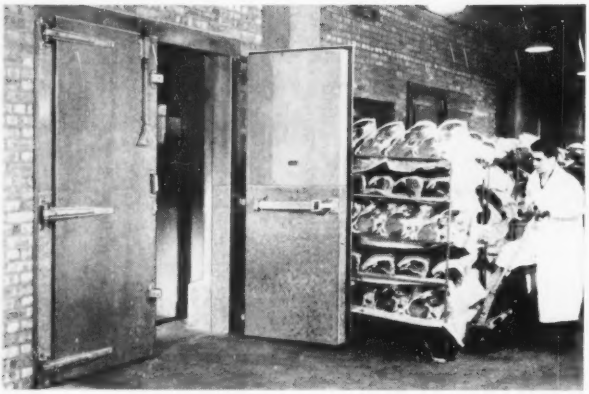
JAMISON Series "50" Double Doors



● Today's *busy* tempo in the vast handling and storage of foods calls for speed and efficiency. There's no time to be lost, no labor to be lost. Jamison Double Doors fill the bill because they're twice as wide and can handle twice as much traffic in moving stock in and out of the refrigerated space.

These 3 views of Jamison Double Doors in use at Illinois Packing Company portray space and speed. Notice the inside metal kickplate—the handy bump-open bar. Here's *your door* for extra years of trouble-free, efficient operation. Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

THERE'S A JAMISON DOOR TO BEST FILL YOUR SPECIFIC NEEDS

The leader for over 50 years

Refrigerated 5-Room Plant Steps Up Banana Output

Smooth circulation of high-humidity cool air through new, specially designed storehouse lets bananas "breathe" while ripening

Losses of bananas have been substantially curtailed at Grower's Marketing Co., Los Angeles, through construction of a refrigerated warehouse designed specifically to meet the two essential requirements—controlled temperature and balanced humidity—of banana storage and ripening.

As green bananas are received, they are moved immediately into one of the plant's five moisture-proof concrete rooms. And, although banana ripening is not a low temperature operation, each room is insulated with 5 in. of seal cork—a more than ample safeguard against seepage and resulting heavy loads on compressor equipment.

Temperatures of 50-55 deg. F. are maintained throughout, since exposure of bananas to extreme cooling results in a gray peel which then turns black at room temperatures. One area, however, is equipped with double overhead refrigeration units, and thus can be utilized for either banana storage and ripening, or for storage of those fruits that require temperatures of 35 F. or lower.

The cooling system consists of six blower-type evaporators supplied with liquid Freon by two cross-connected 10-hp. compressors. The latter operate with a single-shell-and-tube water condenser. Water for the condenser is cooled in a tower on the warehouse roof.

A narrow-limit thermostat controls the amount of liquid entering the evaporator tubes, and an expansion valve automatically feeds the correct amount of liquid refrigerant to the unit.

Mist Spray for Moisture

Combined with the cooler is a pan-type overhead mist spray which supplies the desired amount of suspended moisture for each room. Humidity is thus maintained at 90 percent until

(*Turn to page* 143)

Coming Features in FOOD ENGINEERING

Special articles with the accent on the "how"—to help you do a better job of producing quality food products at low cost—are now "on the line" for early issues. To name just a few . . .

Careful Selection and Placement of Employees

Where Aluminum Is Used to Advantage in Food Plants

Nitrogen Protects Quality of Canned Sour Cherries

How to Simplify Work in Milk Receiving Rooms

Brewery Develops Better Beer; Builds One-Story Plant

Advanced Practices in Carbonated Beverage Plant

Costs and Methods for Pie-Stock Apples (Special Report)

Time-Saving Makeup Methods for Dilute Brine

Improved Technic for Handling Wine Cultures

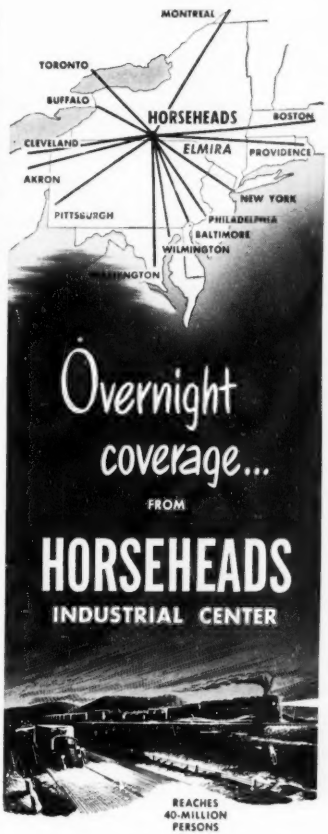
Flour Miller Uses Cheap Water Power To Drive Machines

Quality Peeling Sets New Pace

Last Word in Efficient Butter Packaging

Rigs Mail Meter as Labeler and Cuts Costs

Synchronous Motors Improve Food Plant Power Factor



New In-Transit Point East or West Offers Distribution Savings

Complete warehousing service now offered at Horseheads

- *Carloads in and out*
- *LCL consolidation*
- *Packaging, repacking*
- *Processing, bottling*

Horseheads Industrial Center is served by 30 truck lines and 4 railroads: D. L. & W., Lehigh Valley, Erie, Pennsylvania. *New construction* offered on low-rental basis, for storage, processing, assembly.

For full details, write:

LEHIGH-HORSEHEADS

WAREHOUSE CORP.

Horseheads, N. Y. or
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STURTEVANT DUSTLESS BLENDERS

Thoroughly Blend Substances into an Inseparable Mass

The 4-Way Mixing Action of the Sturtevant Dustless Blenders thoroughly mixes two or more substances into an inseparable whole . . . every part of which is the same analysis. Single receiving and discharging opening insures tight sealing during mixing process. "Open-door" accessibility permits thorough cleaning. The fast, accurate mixing operation increases output . . . cuts mixing costs. Available in many sizes with mixing capacities from ¼ ton to 75 tons per hour. Write for information and catalog.

Receiving — The ingredients to be mixed enter the mixing chamber of drums through a chute. Note scoops which carry up and dump the ingredients as drum rotates assuring a more uniform mix.

Discharging — Throwing a lever closes the inlet and mixer is in discharging position. The completely mixed materials drop off the lifting scoops and discharge through chute without segregation of ingredients.

The Sturtevant Mill Company

106 Clayton Street, Boston 22, Massachusetts

Designers and Manufacturers of: CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

Refrigerated Plant

—*Continued from page* 141

the bananas turn yellow, at which time it is cut back to 85 percent. A humidistat works through a solenoid to control a valve which turns the water on and off—a system so delicately balanced that a humidity loss of only 3 or 4 percent will set the humidifier in operation again.

Meters indicating all operating features of the system—including humidity, temperature, cooling loop suction, and individual blower temperatures—are located on a single control panel, which is checked every half hour by the warehouse engineer. Installation of a single shut-off valve makes it possible to take any single unit out of operation without affecting the refrigeration capacity of the other rooms.

—*End*—

"O_2 Below 0.2" System

—*Continued from page* 92

that chute-feeds bagging or filling machines on the floor below.

Formulated items, such as MIF and high fat products, are fed in through a company-designed arrangement of equipment that lifts and dumps the drums for blending of the products. Since formulas are already supplied in the drums, the function of this batch blending set-up—it handles four drums, or about 1,000 lb. per blend—is to equalize fat content.

Here's how the latter unit works: The steel drums move on roller conveyors from storage to the feed-in area, where the attendant opens and directs each drum into a chain-hoisted cabinet that has a rubber seal in its top fitting the drum opening snugly. This prevents any particles on the outside of the drum from getting into product as it is dumped.

Pushing a button raises the drum to the top of the rig, where it is automatically tilted into the blending chamber. When this chamber is filled—through similar dumping of three other drums—another button is pushed to start the 3-min. blending cycle.

Shaped like a conventional cement mixer, the blending vessel has a stainless steel lining. It is also equipped with built-in vanes that thoroughly stir the contents while the unit rotates. After the 3-min. rotation, the vessel tilts, at the push of a button, to dump the blended product into a stainless steel hopper that fills machines on the floor below.

3—Filling and Capping

Each of five Stokes & Smith vacuum-type fillers, supplied by individual vacuum pumps, handles 32 of the 1-lb. cans per minute. Four of these machines also convert to 4-oz. or 25-lb. cans. Vacuum is applied at this point primarily to get a uniform quantity in each container and reduce occluded air around particles.

About 70 percent of all 1-lb. fills are check-weighed before the containers travel down a belt conveyor to five Canco capping machines. Two of the latter handle 1-lb. cans exclusively. The other three take can sizes from 4 oz. to 5 lb.

Capping is not conventional. Each lid is lightly crimped (can actually be rotated by hand). This looseness allows free passage of gas in the vacuumizing and inert-gas blanketing that follows.

Girls at the discharge end of each capping machine load the cans into specially constructed 20 x 40 in. steel trays. These have a rhomboid shape to ease handling, also perforated sides to allow good gas circulation. When fully loaded (they accommodate 64 of the 1-lb. cans in two tiers), the trays are moved onto a closed-circle roller conveyor that comprises the inner rim of six can-vacuumizing and gassing chambers.

4—Blanketing Under Gas

One operator feeds and empties the six special gas boxes flanking the tray roller conveyor. These heavily constructed, pressure-tight steel chambers are also rhomboid shaped and snugly accommodate one tray. They are fitted with a vacuum connection—three pumps being available to draw down to 5 mm. Hg absolute pressure on the six boxes—and an inert gas line, supplied under 125 lb. pressure from gas storage tanks.

Maple Island engineers designed a special control system that has put the vacuumizing and gassing cycle on a non-varying automatic basis. After the operator deposits the loaded tray and clamps the box, the following sequence is inaugurated by positioning a lever:

1. Vacuum is drawn in the chamber, with a red light glowing on the panel when 5 mm. Hg has been reached.

2. Operator then throws lever in opposite direction, which releases vacuum and automatically blankets cans with inert gas.

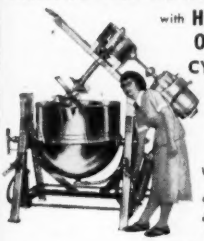
3. When gassing pressure reaches 2 lb., a green light signals, then operator throws lever to third position,

(*Turn to page* 148)

Complete
PRODUCT MIXING
with
LEE DOUBLE-MOTION Center Line Scraper AGITATORS

Standard equipment for over 20 years.

Safe Controlled
RAISING AND LOWERING
with Hydraulic Operated CYLINDER



Operates directly from your present water system

Swings out
FOR EASY CLEANING

Cleaning over kettle means

- No hot messy parts to disassemble
- Savings in time and labor
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Our descriptive bulletins on these units will interest you—*WRITE FOR THEM.*

LEE METAL PRODUCTS CO.
416 PINE STREET
PHILIPSBURG, PA.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

Here's Why it Pays You to Read the Advertising

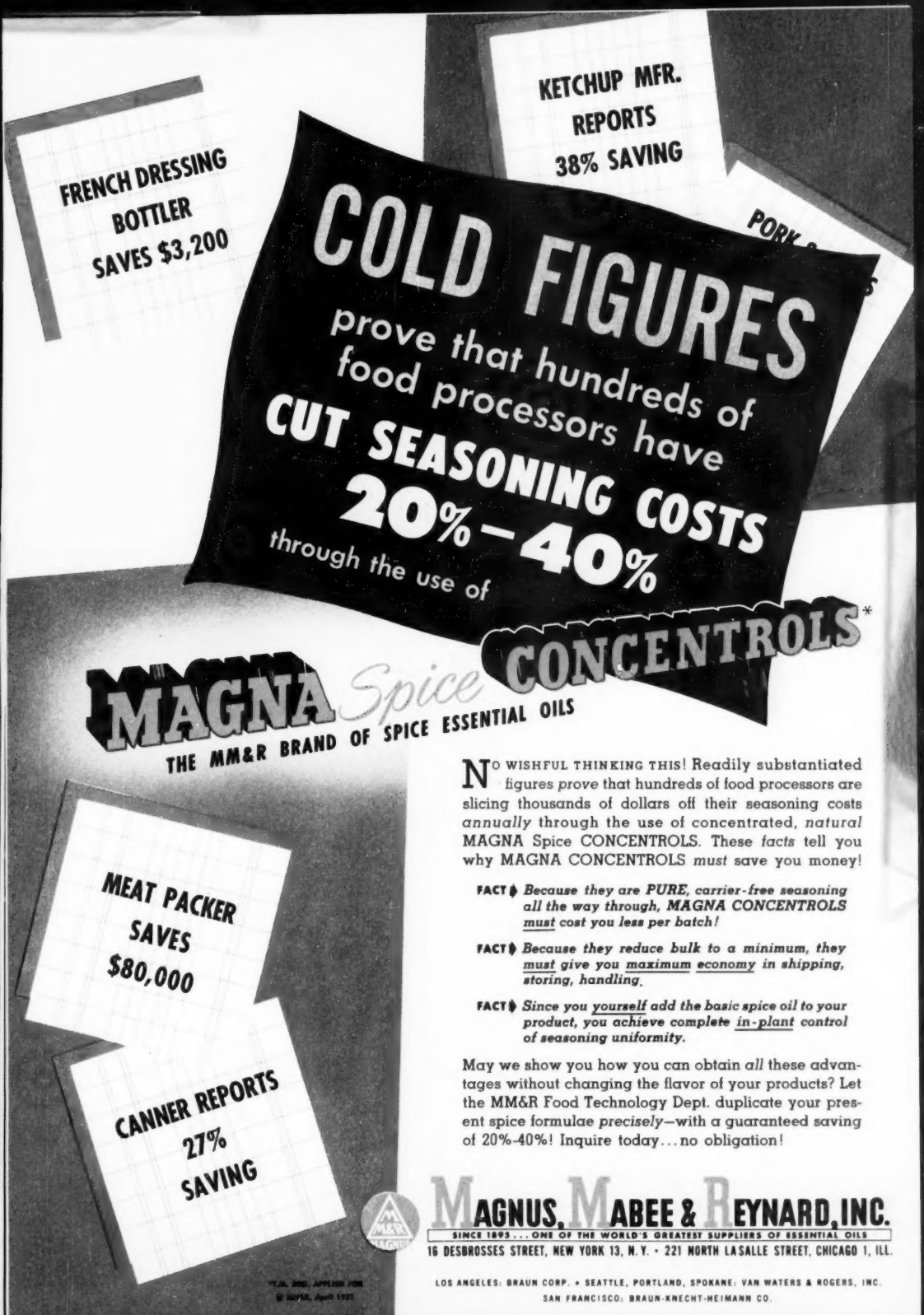
The advertising is a rich source of valuable information. In this magazine it offers you ideas and products that may well apply advantageously to your business.

Every issue is a catalog of goods, materials, and services – quickly available to you – just for the reading.

Leaders in business and industry turn to the advertising because they've discovered it helps them run their businesses more profitably.

When you read all the ads in this magazine, the chances are good that you'll get a lead that will materially help you do a better job. For example, you may find a specific piece of equipment that will be a profitable time-saver. Or a tool that will increase worker efficiency. That's why it pays to read the advertising. It's good business.

McGRAW-HILL
publications


FRENCH DRESSING BOTTLER SAVES $3,200
KETCHUP MFR. REPORTS 38% SAVING
COLD FIGURES
prove that hundreds of food processors have
CUT SEASONING COSTS 20%–40%
through the use of
MAGNA Spice CONCENTROLS*
THE MM&R BRAND OF SPICE ESSENTIAL OILS
MEAT PACKER SAVES $80,000
CANNER REPORTS 27% SAVING

NO WISHFUL THINKING THIS! Readily substantiated figures *prove* that hundreds of food processors are slicing thousands of dollars off their seasoning costs *annually* through the use of concentrated, *natural* MAGNA Spice CONCENTROLS. These *facts* tell you why MAGNA CONCENTROLS *must* save you money!

FACT ▸ ***Because they are PURE, carrier-free seasoning all the way through, MAGNA CONCENTROLS must cost you less per batch!***

FACT ▸ ***Because they reduce bulk to a minimum, they must give you maximum economy in shipping, storing, handling.***

FACT ▸ ***Since you yourself add the basic spice oil to your product, you achieve complete in-plant control of seasoning uniformity.***

May we show you how you can obtain *all* these advantages without changing the flavor of your products? Let the MM&R Food Technology Dept. duplicate your present spice formulae *precisely*—with a guaranteed saving of 20%-40%! Inquire today... no obligation!

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SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

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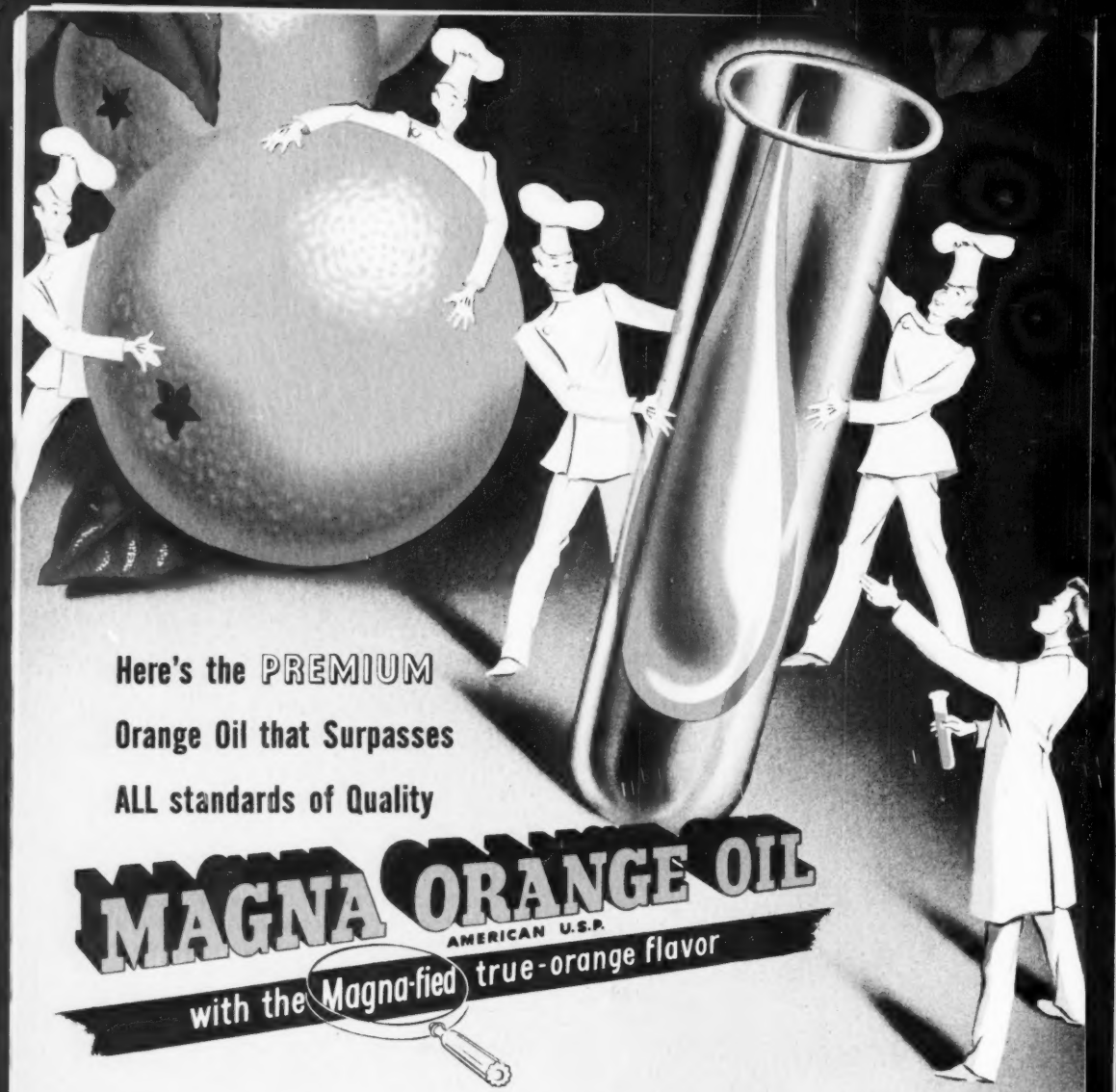

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Orange Oil that Surpasses
ALL standards of Quality

MAGNA ORANGE OIL

AMERICAN U.S.P.

with the Magna-fied true-orange flavor

Think you are using the best Orange Oil now? Then keep an open mind while you try MAGNA ORANGE OIL – the Orange Oil that gives you *maximum* uniformity, *maximum* solubility, *maximum* flavor trueness! Your first trial batch will prove to you what *thousands* of users have already discovered – that MAGNA ORANGE OIL is *surprisingly better!* Surprising, too, how *much* you save when you specify MAGNA ORANGE OIL. Write for complete information and schedule of prices.

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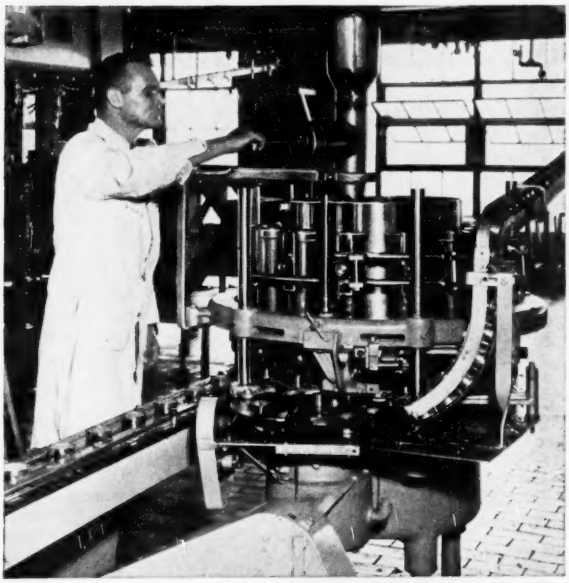
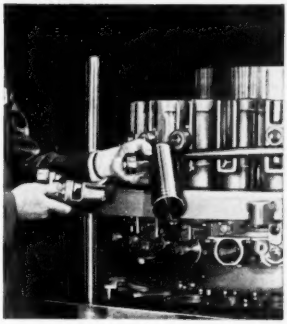
KINGAN & CO. CUT MEAT FILLING COSTS WITH *Pfaudler* PISTON FILLERS



THIS 14-STATION PFAUDLER Rotary Piston Filler fills cans of potted meat cleanly and rapidly at the Indianapolis plant of Kingan & Co.



PISTONS AND SELF-COMPENSATING cut-off valves are fast and easy to clean. This helps improve sanitation and cut labor cost.

Kingan & Co., of Indianapolis, Indiana, have been able to cut labor costs and boost the efficiency of their potted meat filling operation with a Pfaudler Piston Filler. And so can you!

This filler is so fast and easy to clean that it eliminates many hours of costly labor each week. And the time required for changing from one product to another is chopped to practically nothing.

The Pfaudler filler makes this saving possible because both the pistons and the cut-off valves can be readily removed in one piece by hand. No tools are needed. Only Pfaudler fillers have this outstanding economy feature.

Fewer fillers are needed to do the job, too, because Pfaudler fillers deliver large-volume output at top speed. Capacities range from 100 to 600 containers per minute, depending on the product being filled.

In addition, the Pfaudler "no-can-no-fill" feature gives positive protection against wasteful spillage. There's no need for topping glass jars because an instantaneous volume adjustment controls fill within a fraction of an ounce.

For full details contained in our special filler catalog, just mail the handy coupon.

THE PFAUDLER CO.
Dept. FE-11, Rochester 3, N.Y.

Please send me Bulletin 876 with full details on Pfaudler Piston Fillers.

Name_____

Company_____

Title_____

Address_____

City_____ Zone_____ State_____

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Piston Fillers · Steam Peelers · Deaerators · Vacuum Pans · Evaporators

A BETTER CLOSURE for SMALL PAPER BAGS

FOR lower production costs . . . stronger, neater closures . . . ability to get out rush orders in a hurry, you can't beat Union Special Bag Closing Machines! Specially built to stand up under heavy production schedules, these machines provide the high output rates needed to meet modern competitive conditions.

Ask for Recommendations

UNION SPECIAL MACHINE CO.
450 N. Franklin St., Chicago 10, Ill.

Gentlemen: Without obligating me, please furnish information on bag closing equipment to handle the following production:

Kind of bags used? _____
Filled weight of bag? _____
Material being packed? _____
Maximum bags per minute? _____
Check-weighing required? _____
Conveyor required on Machine? _____
Power: ☐ D.C., ☐ A.C., Volts _____
Phase _____ Cycles _____
Name _____
Company _____
Address _____

releasing pressure and allowing trays to be removed.

Previous methods of controlling the gassing cycle were based on a timing device. But there were unsatisfactory results, provoking development of the new system, which actually measures vacuum and pressure before the process can proceed. A special Honeywell Pressuretrol, with bellows able to stand high vacuum, actuates the green signal light when box pressure reaches 2 lb. above atmospheric. And a company-designed mercury-in-glass vacuum controller, with sealed-in wire contacts, signals the red light at proper vacuum. A double-pole double-throw electronic relay, also home devised, provides step-up power for vacuum control.

From the gas boxes, the trays are very carefully moved to Canco sealing machines, similar to the cappers but with no lid feed. Gentle handling is needed to prevent lighter air from seeping in, before sealing, to displace the heavier inert gas blanketing the product. After sealing, the packages are placed in cartons and palletized for shipment.

All operations, from feed-in to sealing, have been set up on a conveyor basis with as close an approach to continuous product flow as possible. Also, the company has constantly worked to apply short-cuts and improvements, and as a result output has been more than doubled over the original estimated capacity. One recent 12-hr. day saw a record run of close to 100,000 of the 1-lb. cans.

5—Generate Own Gas

To keep up with the new plant's large demand for inert gas, a complete generating unit was installed in a small corner of the building. It has been estimated that this equipment, put in by Gas Atmospheres, Inc., has paid for itself within a year.

Three individual units comprise the gas-producing set. Primary component is the gas generator itself, which burns propane (or natural) gas with air at a fixed ratio. The actual proportion used is 530 cu. ft. of air to 72 cu. ft. of propane—controlled through the readings of two Rotameters. The resulting gas delivered by this unit is 88 percent nitrogen and 12 percent carbon dioxide.

Next, the gas passes through a drying chamber loaded with silica gel. Use of two such chambers alternately increases drying efficiency.

Third unit in the system is the trace-oxygen removal tube. This is a nickle-alloy chamber filled with steel shavings that are heated by pryometer-controlled gas burners to 1,500 deg. F. Passage of gas through this chamber effectively burns off any traces of oxygen that might remain in it.

The dry, oxygen-free inert gas then is sent to two 1,200 cu. ft. storage tanks, from which it is fed to process. Stored under 125 lb. pressure, the gas receives frequent checks for purity.

6—Integrated Lab Check

Primary object of the canning technics of double vacuumizing and inert gas blanketing is to reduce container-oxygen to a minimum. A high grade dry milk product should not show an oxygen content of over 2 percent. And this figure is much too high for premium grade dry whole milk.

To maintain a constant check on the efficiency of our process, up to 25 Orsat oxygen determination tests are made, on random cans, by the plant laboratory during each 8-hr. run. When oxygen is found to trend above 0.2 percent, processing is stopped until the trouble spot is located.

In addition, at least 15 cans a day are tested for leaks. By submerging in water under vacuum, "leakers" can be spotted and corrected rapidly. They are usually caused by improper seaming of the can.

Constant vigilance in both plant and lab has really paid off. Our products consistently contain less oxygen than that allowed as a minimum by content standards set for premium products. Also, our products retain flavor and sparkle after long periods in their packages—and are thus attracting an ever-growing group of pleased users, both here and abroad.

End (Resume reading on page 93)

Nuts: Better Kept—Better Candy

—Continued from page 131

more pronounced was the masking effect of candy on the nut flavor.

Actually, the flavor of nuts improved immediately after harvesting and holding them 1 to 2 months in common storage. The practice of digging peanuts from the ground or picking pecans directly from trees and then immediately putting them under refrigeration did not have the beneficial effect expected. In fact, these nuts had a better flavor when they were aged or treated in the usual manner (drying, cleaning, bagging, and warehousing) and then kept under refrigeration to retain quality.

Small, seedling pecans aged more rapidly, and generally had a more desirable flavor than the larger Stuarts. Undoubtedly, other varieties would have reacted differently. Broken pecan

What **YOU** *should know about*

Dowfume EB-15

for machinery and spot fumigation

1. **Highly effective against all common pests of food processing establishments.**
2. **Low volatility.**
3. **Nonflammable.**
4. **Has a warning odor as a safety factor.**
5. **Economical.**
6. **Time-saving—easy to apply without special equipment.**
7. **Residual effect delays reinfestation of stock.**

Dowfume EB-15 has a definite place in every food plant sanitation program. When used periodically between general space fumigations with Dow Methyl Bromide, it helps maintain a very low level of insect population.

Spot fumigation is an efficient method of eliminating insects in their breeding places, such as in dead stock in machinery and handling equipment capable of retaining fumigant vapors. Any machines which are apt to have dead stock accumulations in corners, cracks and crevices should be treated with Dowfume EB-15. When properly applied, this efficient material can remain effective as long as 30 days—therefore, treatments are suggested at monthly intervals.

We will gladly furnish the name of a qualified PCO in your locality, specializing in this type of fumigation service. Write our Fumigant Department.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Atlanta • Cleveland • Detroit • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

When you use fumigants . . . insist upon

DOW QUALITY

Dow Methyl Bromide • Dowfume EB-15
Dowfume EB-5 • Dowfume MC-2
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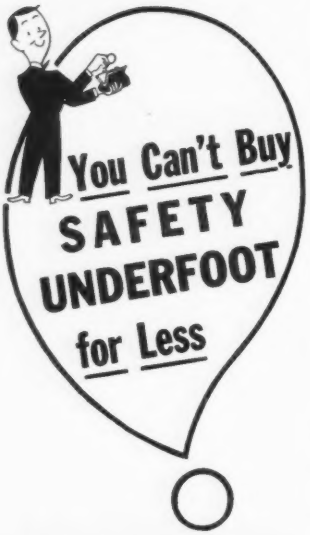
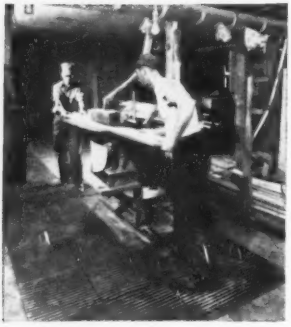
DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY
AND AGRICULTURE





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RUBBER & CORD MATTING

also serves as the ideal comfort mat.

Used in entrances, corridors and lobbies, it affords an effective remover of dirt from the soles of shoes.

Hugs the floor. Beveled edges. Comes in rolls 20'5" long, comprised of 35"x35" units of four 17-inch square sections. Easily cut to cover desired area.

Four mottled colors: Venetian Red, Erin Green, Delft Blue and Mosaic.

Send coupon today for literature and prices.

AMERICAN MAT CORPORATION
1797 Adams Street, Toledo 2, Ohio

Please send literature and prices on Do-All Matting.

Name .....
Firm .....
Street .....
City & State .....

IN CANADA: American Mat Corp. Ltd., Canada Trust Bldg., Windsor, Ontario

halves and split peanuts became stale and rancid more rapidly than whole pecan halves or peanuts with unbroken skins. Losses in quality were proportional to the amount of breakage—the more surface exposed, the poorer the quality of the nuts.

It was noted that Spanish peanuts cooked to a smoother finish than did Virginias, with less reddening of the skins. Reddening caused by cooking and aging (holding in storage) was similar.

Recommended Practice

For confectioners and other food processors, the data provide a means for comparing methods of holding peanuts and pecans so they can be used the year round.

Nuts should be graded and all extraneous material removed before storing them. General practice is to shell the nuts prior to storage. At the present time, about 97 percent of the peanuts, a high percentage of almonds, and about 50 percent of pecans, are shelled before they go into refrigerated storage.

Shelled nuts in common storage are vulnerable to infestation, and means of combating insects in nut meats by fumigation are not entirely satisfactory. Even though nut meats are freed of insects by fumigation, bags and boxes generally used for containers offer only token resistance to reinfestation.

Refrigeration of nuts at 48 deg. F., or lower, is the most practical means of: (1) Preventing insect infestation, (2) retarding mold growth when moisture contents are high, (3) retaining optimum flavor, (4) minimizing staleness and rancidity, and (5) maintaining the natural color of the nuts.

Experience has shown that shelled or unshelled nuts keep better at lower temperatures. And the nuts were not damaged by storage at 0 deg. F. or lower. Storing the nuts at 28 deg. F., was an excellent way of drying them, since the moisture in the air at this temperature is low.

Where high moisture conditions or molding is a problem, lowering the storage temperature temporarily to 28 deg. F. may be a suitable method of eventually drying nuts. However, under prolonged storage at this temperature, pecan halves may become dry and brittle.

Results Briefed

1. The practice of storing nuts under refrigeration was an effective method of preserving their original fresh color, aroma, and flavor; retarding rancidity; and keeping insects out of pecans and peanuts. Results obtained with almonds were not conclusive.

2. The color and flavor of unshelled nuts held in refrigerated or common storage were superior to those of the shelled product.

3. Of the five varieties of nuts tested, Stuart pecans had the shortest storage life. Closely following were Texas seedling pecans, Virginia peanuts, and then Spanish peanuts. Almonds held up the longest.

4. As long as the quality remained high, stored pecan meats and peanuts were judged better in the raw state than in candies. But as soon as staleness or rancidity set in, the candy apparently masked the off-quality.

The above feature is based on the paper, "Storage of Nuts for Confections," which was authorized for publication as Technical Paper No. 215, Journal Series of the Georgia Experiment Station.

Aiding in the scoring of the nut candies were representatives of Bemis Bag Co., Mobile, Ala.; Elmer Candy Co., New Orleans; Georgia Experiment Station, Experiment, Ga.; National Confectioners' Assn., Chicago; Norris Candy Co., Atlanta; Mary E. Pennington, New York City; Quincy Market Cold Storage Co., Boston; U. S. Cold Storage Co., Kansas City, Mo.; U. S. Quartermaster Food & Container Institute, Chicago; and U. S. Western Regional Laboratory, Albany, Calif.

End (Resume reading on page 133)

Two "Robot" Units

—Continued from page 89

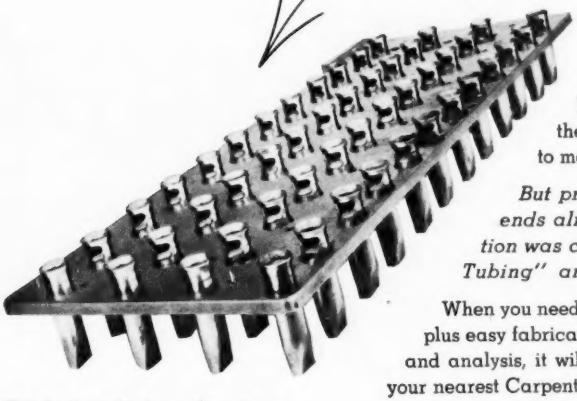
elements. They are: (1) Two unloading heads that are mounted above the infeed table, and (2) A short conveyor on which are fitted bars that position cases of empty bottles under the unloading heads.

In operation, cases of empties are fed to the washer on a standard conveyor, then move, one at a time, onto the conveyor section of the uncaser. Here the case is held between two plates that exert pressure on its sides, until one of the cross bars moves it forward. Immediately, a second case is pushed onto the conveyor and a cross bar moves this case forward also.

"Fingered" Out

Upon reaching the predetermined unloading positions, the conveyor stops and the two unloading heads descend into the cases. Air operated fingers then close around the necks of the bottles and the heads lift them high enough to clear the case tops. The heads move inward over the washer infeed conveyor and gently deposit the bottles on it. Heads then move back

FOOD PRODUCER DEVELOPS NEW PRODUCTION IDEA with *Carpenter* Stainless Tubing



Exactly the right temper for swaging and flaring, and a good, bright finish, were the bonus features this food processor got by specifying Carpenter Stainless Tubing, Type 304.

When this mass production assembly for holding "ice cream on sticks" was developed, the job called for "Type 304 Stainless Tubing" to meet sanitary requirements.

But problems in swaging and flaring the tube ends almost licked the idea. Then the specification was changed to "Carpenter *Type 304 Stainless Tubing" and fabricating problems disappeared.*

When you need the sanitary advantages of Stainless Tubing, plus easy fabrication because of uniformity in finish, tolerance and analysis, it will pay you to get in touch with Carpenter or your nearest Carpenter Stainless Tubing Distributor.

NEW SLIDE CHART ON BENDING STAINLESS TUBING

This new Carpenter service can help you conserve material, get best results with Stainless Tubing and Pipe. Covers bending radii, coil diameters for various sizes and gauges. A note on your company letterhead will bring you the new Carpenter Tubing Slide Chart.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department: The Carpenter Steel Co., Reading, Pa. "CARSTEELCO"

Carpenter

STAINLESS TUBING

—guaranteed on every shipment

In this small floor space you can make

BIG SAVINGS ON CARTON COSTS

If you are now buying finished cartons or blanks that you set up by hand, you can't ignore the striking savings a Palmer Carton Former offers.

In only 3′ x 6′ of floor space, this remarkable machine turns out up to 102 perfectly formed, tightly glued cartons per minute. Savings on carton material costs *alone* often pay for the machine in less than a year.

The only attention it requires is to keep it supplied with blanks. Since the machine's magazine holds from 500 to 1,000 blanks, depending on the style of carton, one person can attend to feeding and do other useful work besides.

Due to its advanced design, the Palmer operates on the principle of *continuous motion.* Gluing time is nine times greater than in other machines, in spite of its high speed. Its specially designed mandrels and forming plates result in greater accuracy, permitting perfect registration of printed matter on sides and ends of cartons. And it's easily adjustable for different sizes.

The Palmer can be adapted to produce virtually any type of single or double-walled carton. Therefore, no radical change need be made in your present style of carton in order to benefit by the Palmer's savings.

PACKAGE MACHINERY COMPANY
CARTON DIVISION
SPRINGFIELD, MASSACHUSETTS

Learn how leading manufacturers are saving money on their cartons.

Write for literature on the Palmer

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

into position over the case conveyor.

In the meantime, as soon as the empty bottles are lifted clear of the cases, the uncaser conveyor section starts, moves the empty cases onto a discharge conveyor, and positions two more cases of empty bottles under the unloading heads.

Operations of the different elements are synchronized so that the case unloader cannot operate unless the washer is running, and so that more than two cases cannot enter the conveyor at one time. Safety stops are provided to prevent damage to machine or bottles.

When the unit was first installed, Schaefer's experienced considerable difficulty in removing the empty bottles from the paperboard cartons without lifting the cartons and liners off the conveyor. But this difficulty has now been overcome by a shop-made device —a flat steel bar mounted above the conveyor at such a height that it just clears the top of the cases. This bar holds cases and liners in place so bottles are easily removed.

Previously, three men were required to hand-feed the 300-bottle-per-minute washer. Now, one man supervises the operation of the unloading unit, and the two additional men are available for inspection of empty cases and bottles.

About the New Caser

The other new unit—the automatic case packer—was engineered by Standard-Knapp Div., Hartford Empire Co. In it, filled bottles are assembled in groups of 24 (four rows of six), then automatically placed in a waiting container.

Filled bottles are conveyed from the labelers on two parallel lines. Upon arrival at the new caser, each of these lines is divided into three separate lines by means of vibrating plates. In this way, bottles move toward the easing head six abreast. Meantime, empty cartons arrive by conveyor from the case unloader and are positioned, one at a time, under the packer.

When 24 bottles are assembled, a Microswitch actuates the elevator that raises the empty case into position to be loaded. Another switch then releases the bottles and they drop into the case. The filled case is lowered to the conveyor level, moves on to storage, and is replaced by another empty container.

To guard against operation of the caser when less than a load is assembled, a trip is placed at the front of each of the six lines. As the required number of bottles is assembled in any one line, the trip is released. But no bottles drop into the case until all trips are thrown.

In the previously used cases (a semi-

Congratulations to the Food Industry of America

Enriched foods mean better living for the American people. Ten years ago, when American millers and bakers introduced enriched flour and bread, they launched a new era in nutrition.

Since then, faith in the Enrichment Program has been reaffirmed many times. The human values of enriched foods have been factually established in terms of higher health levels and improved mental and physical vigor.

As we enter the second decade of Enrichment, Merck salutes the Baking and Milling Industries of America for this accomplishment.

MERCK VITAMIN PRODUCTS FOR ENRICHMENT AND FORTIFICATION:

VITAMIN B_1
Thiamine Hydrochloride (*Vitamin B_1 Hydrochloride*)
Thiamine Mononitrate (*Vitamin B_1 Mononitrate*)

RIBOFLAVIN (*Vitamin B_2*)

NIACIN (*Nicotinic Acid*)

ASCORBIC ACID (*Vitamin C*)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers —Merck Vitamin Mixtures for Flour Enrichment—Merck Bread-Enrichment Wafers—Merck Vitamin Mixtures for Corn Products Enrichment—Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

Merck is Proud to Have Played a Part in the Enrichment Program

For several years before the birth of Enrichment, Merck research and production staffs had been at work on the synthesis and manufacture of thiamine, riboflavin, niacin, and other pure vitamins. When they were needed for the Enrichment Program, as well as for general food fortification, Merck was ready.

We are proud to have been associated with the food industry throughout these ten historic years of Enrichment.

MERCK VITAMIN PRODUCTS

For Enrichment and Fortification

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY
In Canada: MERCK & CO. Limited—Montreal

"Largest Ready-To-Eat-Cereal Company in the World"

Modernizes with **DAY**

DUST CONTROL—MATERIAL HANDLING

From a small one-room corn flakes plant, operated by W. K. Kellogg, soon after the turn of the century, has sprung the Kellogg world wide ready-to-eat-cereal enterprise with plants in Battle Creek, Michigan; Omaha, Nebraska; Canada; Great Britain; Australia; South Africa and Mexico. Today, the Kellogg Company manufactures nearly a dozen different ready-to-eat-cereals, and in addition, dog, poultry and stock feeds. Kellogg products are known and distributed throughout the world, and the company has become known as the "Largest Ready-To-Eat-Cereal Company in the World."

In a recent modernization program at Kellogg's large Battle Creek, Michigan plant the DAY Company was selected to engineer, manufacture and install dust control, material handling and storage equipment. The total project included the following:

DUST CONTROL FOR CORN AND WHEAT CLEANING: A turn-key job which included DAY Type "AC" Dust Filters with proven dust collection efficiencies of 99.99% and better; the widely accepted DAY Dual Clone Dust Separators which assure maximum centrifugal dust separation, and DAY Exhausters designed for highest efficiency in dust control applications.

MATERIAL HANDLING: DAY self-cleaning Pneumatic Conveyor system was installed for fast, dust-free grits conveying.

CEREAL STORAGE: For use in the storage of Rice Krispies, DAY fire and vermin proof, non-bridging bulk storage bins were supplied. These bins are furnished in either heavy, galvanized black iron or stainless steel.

LEADING COMPANIES RELY ON DAY

Records show that most of the nation's leading millers and many food processors depend upon DAY. According to a national survey, DAY dust control equipment is the predominant choice, with DAY leading its nearest competitor in this field of dust control by a margin of 10 to 1.

DAY EXPERIENCE CAN SOLVE YOUR DUST CONTROL PROBLEMS

This achievement record, plus the experience gained by The DAY Company in engineering, manufacturing and installing dust control systems for food processing plants since 1881 is of great importance to you. It means that when you call upon DAY, you benefit from their 70 years' experience. No other dust control manufacturer can even approach DAY's accumulated knowledge in this specialized field. Regardless of your dust problem, DAY can provide an effective and economical solution. For engineering assistance and cost estimates, Write-to-DAY!

DAY SINCE 1881

The **DAY** *Company*

817 Third Avenue Northeast, Minneapolis 13, Minnesota
IN CANADA: P. O. Box 700, Ft. William, Ont.
Branch Plants in Fort Worth, Buffalo and Welland, Ont.

automatic), an operator positioned the case, tripped a pedal to release the assembled bottles, then moved the filled case onto a conveyor for transportation to storage. Today, an operator is still used at the new unit. But instead of having to perform specific functions he is free to check performance of the caser and, also, the condition of empty cases.

As a result of the installation of these units, Schaefer's has reduced hazards and worker fatigue, and it has increased bottling-line production.

End (Resume reading on page 90)

Mechanized Handling

—Continued from page 61

possible answers, then called in Alden Engineering Co., of Boston. In short order, engineers of this firm came up with the solution—a special system of conveyors and bins.

Today, fish coming from the trawlers are fed into a de-icer—a rotary drum with 1¼-in. mesh screens for separating ice from the fish. From the de-icer, fish are discharged onto a 2-ft.-wide wire-mesh conveyor equipped with metal flights space 1-ft. apart. On this equipment, they are elevated 12 ft. to the weighing and re-icing station.

Purpose of removing the original ice before weighing is to assure getting the true fish weight, upon which basis the fishermen are paid.

After the fish are weighed (in a hopper-bottom metal bin mounted on a scale), a slide-gate valve is opened and the fish drop on another wire-mesh flight conveyor. At this point, they are re-iced. Then they are elevated to a horizontal canvas-belt conveyor moving directly over six 16,000-lb.-capacity metal storage bins. The iced fish are dropped off the conveyor into these bins.

Practically Automatic

From here, feeding of the fish to the processing department (scaling, filleting, and packaging) is almost completely automatic. A chain hoist, mounted on a monorail, moves to the bin that is to be opened. The chain is attached to a bracket at the bottom of the slide gate, and as the gate is raised, the fish tumble out of the bin onto a horizontal wire-mesh conveyor.

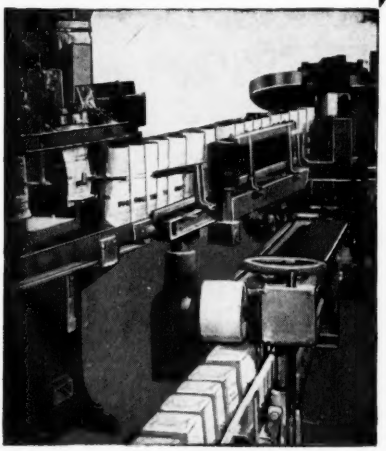
This conveyor discharges the fish onto a flight conveyor that dumps them into a flume for movement to the rotary scaler that starts the processing operations.

End (Resume reading on page 62)

THE BEMIS DELTASEAL BAG *PLUS* DELTASEAL PACKAGING EQUIPMENT

Equals

The most Economical, Efficient Package for Your Product



- Deltaseal® filling and closing is fast... mostly automatic... less handling.
- Deltaseal Bags have a neat, square, full-pack appearance... build easily into eye-catching displays.
- Crisp, brilliant Bemis printing on Deltaseals headlines your brand.
- Consumers like Deltaseal's exclusive Pull-Cut-Pour Spout.
- Bemis Packaging Specialists help you get the smoothest, most economical service from your Deltaseal System.

Ask the Bemis man for the complete Deltaseal story

"America's No. 1 Bag Maker"

Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland • Denver Detroit • East Pepperell • Houston • Indianapolis • Jacksonville, Fla. • Kansas City Los Angeles • Louisville • Memphis • Minneapolis • Mobile • New Orleans • New York City Norfolk • Oklahoma City • Omaha • Peoria • Phoenix • Pittsburgh • St. Louis • Salina Salt Lake City • San Francisco • Seattle • Vancouver, Wash. • Wichita • Wilmington, Calif.

.Bemis

NEW PACKAGES & PRODUCTS

Frozen Meals Encased In Aluminum

The novel packaging of its quick-frozen, precooked meals have been winning wide consumer acceptance for FrigiDinners, Inc., Philadelphia. Developed about two years ago for airline passengers, Army, Navy and Air Force men, these packages are now being made available to the retail trade.

FrigiDinners provide a complete meal, including main course, vegetables and gravies in a single package. At present, 10 of these meals are available—

Swiss Steak, with mushroom sauce, green peas and whole kernel sweet corn; Chopped Beef, with onion sauce, green peas and mashed potatoes; Beef Stew, with green peas and whole kernel sweet corn; Codfish Cakes, with tomato sauce, macaroni and cheese and green peas; Roast Turkey, with giblet sauce, mashed sweet potatoes and green peas; Deviled Crab, with French fried potatoes, green peas and butter sauce; Chinese Dinner, consisting of two egg rolls, chicken chow mein and fried rice; Fillet of Haddock, with better sauce, string beans and creamed potatoes; Pot Roast of Beef, with mashed potatoes, gravy and string beans; and Veal Goulash, with parsley potatoes and green peas.

These dinners are placed in a partitioned tray, constructed of a very light gage aluminum, then are covered with aluminum foil and quick frozen. The tray acts as a package, cooking utensil and dinner plate, all in one. The foil covering not only holds the ingredients in place but makes possible a "pressure cooking" action. Covered tray with the frozen meal is put on top of the stove or in the oven. And approximately 12 min. later the meal is ready to put on the table, piping hot and in the same attractive aluminum platter in which it was heated.

In addition to the 10 dinners, the company is also marketing 5 items in a 5½-in. aluminum casserole. These are Beef Pot Pie, Chicken Pot Pie, Veal Goulash, Beef Stew, and Spaghetti with Meat Balls.

Alcoa aluminum, product of the Aluminum Co., of America, Pittsburgh, is used in the packaging.

New On Frozen Food Market:

—Mae Rich brand frozen cream cheese cakes, a product of Nomar Foods, New York City.

—Frozen chicken pot pies, being distributed nationally. Companies include Morton Packing Co., Louisville, Ky., and C. A. Swanson & Sons, Omaha, Nebraska.

—Complete line of frozen Chinese foods, including egg rolls, fried rice, wonton soup and chop suey by Chin & Lee Co., Inc., New York City.

—Frozen chile under brand name of "Fiesta" marketed by The Chile Co., Seattle.

Ready-to-Cook Live Decapods In Unique Package

1 LIVE LOBSTERS (clams, too, if desired) are packed in ready-to-cook metal containers between layers of rockweed and placed in pine barrels, filled with crushed ice and covered with burlap. They are shipped via Railway Express, with re-icing enroute if necessary.

2 ON ARRIVAL, consumer just removes burlap cover and takes container out of ice-filled cask. The seafood need not be touched, unless you wish to prepare it some other way. No drawing, cleaning, basting or parboiling needed, and the container is your cooking utensil.

3 PUNCH HOLE in lid. Pour 1 qt. of salted water through the opening. If it is the lobster-and-clam combination, leave the clams right in the container with the lobsters. Cooking them together in their rockweed blankets gives that Down East clambake style.

4 NOW SET container on stove or over an open fire. And after steam appears let cook for 15 min. That is all there is to it. Just remove the steam-cooked seafood from the container and it is ready to be served with melted butter and plenty of napkins.

Live lobsters, also clams ready to steam in their own container, are now available from Saltwater Farm, Inc., Damariscotta, Me.

Four different packs are now being offered—8 live lobsters and one-half peck steamer clams; 16 live lobsters and a full peck of steamer clams; 10 live lobsters; and 20 live lobsters.

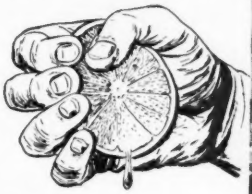
The company guarantees to deliver this seafood alive to any express point within 1,800 miles of Damariscotta and on any specified date. This guarantee is subject to conditions, such as strikes. But the company claims a "batting average of over 99 percent" in its deliveries.

Lobsters are hand-picked, each being about 1 ⅛ lb. Freshly dug clams are picked over one by one, cleaned and packed with the lobsters in cushions of rockweed.

For More Data on Package Supplies Named, Use Reader Service Card

Squeezing Extra Profit

out of the orange concentrate business



It's a remarkable product—this orange concentrate . . . a boon to housewives, a welcome relief to household budgets, and a vast market for the enterprising producers.

As might be expected, these producers have selected the most advanced equipment in order to produce at lowest costs—maximum profit. Included are Worthington Worthite Centrifugal Pumps with mechanical seals. Many installations in Florida and California are now in their third season, continually providing worthwhile savings through:

Exceptional resistance to corrosion—no repairs or shutdown.

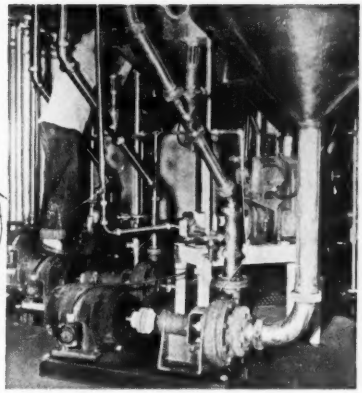
Maintained high vacuum—no air in-leakage.

Easy cleaning, without opening for steaming—by circulating the cleaning chemical through the evaporators.

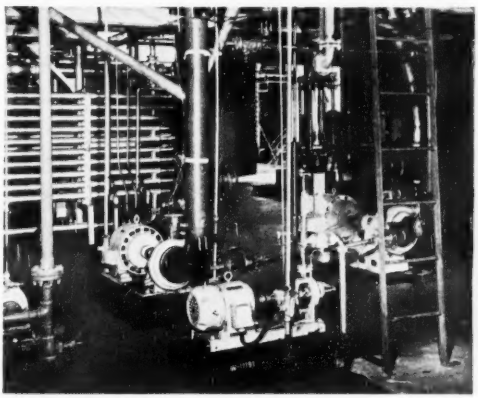
Low power consumption for circulating the heavy viscous concentrate.

Quiet operation without cavitation with unusually low required NPSH.

First cost is low, too. Investigate Worthington Worthite Pumps for *any* acid or alkali applications—weak or strong. Worthington Worthite Pumps are built in standard sizes, from 1 to 20,000 gpm. For further proof that *there's more worth in Worthington*, call our nearest District Office or write to Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, New Jersey.



FLORIDA CITRUS CANNERS COOPERATIVE (Lake Wales, Fla.) uses Worthington Worthite Pumps (mechanical-seal type) to circulate concentrate in a Mojonnier Bros. evaporator, 29.5" to 29.7" Hg vacuum, where fresh, depulped orange juice is concentrated at low temperature to ⅙ its original water volume. These pumps are now in their third season without repair.

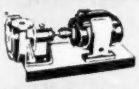


MINUTE MAID CORP. (Plymouth, Fla.) installation uses Worthington Worthite Pumps (mechanical-seal type) on this Buflovak Evaporator. Large pumps in rear circulate the orange juice, small pump discharges concentrate through Rotameter from 29.5" Hg vacuum to holding tank under atmospheric pressure.

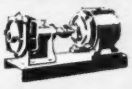
WORTHINGTON

C.1.3

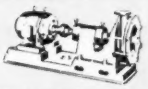
THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB



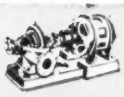
Types C G and C G L. Sizes ¾" to 10". Capacities to 5000 GPM; heads to 200 ft. Liquid ends of WORTHITE alloy.



Type C F. Sizes 1" to 4". Capacities to 1000 GPM; heads to 130 ft. Standard, all iron and all bronze.



Type C Q. Sizes 1½" to 3". Capacities to 600 GPM; heads to 130 ft. at 1750 RPM. Closed impeller. WORTHITE shaft and fittings.



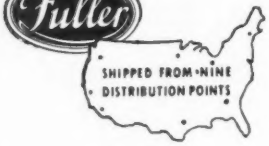
Type L. Sizes 3" to 8". Capacities to 2250 GPM; heads to 300 ft. Single stage volute. For general service.

FROM THE TEST TUBES OF THE FULLER RESEARCH LABORATORY

Fuller has called on modern chemistry to fill in the chinks in Nature's processes. Take gloss, for example. Fuller's modern research laboratory has developed a new method of crystallization control which permits Fuller Floor Waxes to hold gloss longer, yet remain extremely durable to wear. Water resistant — yet easily removed with *soap* and water. Anti-slip — yet not tacky.

Also: Fuller Furniture Polish, Metal Polish and All-Purpose Cleaner. For more information, write to . . .

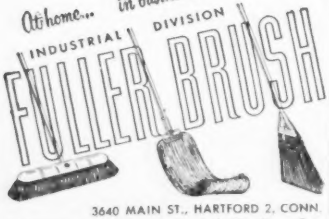
Fuller



At home... in business, too

INDUSTRIAL DIVISION

FULLER BRUSH



3640 MAIN ST., HARTFORD 2, CONN.
In Canada: Fuller Brush Co., Ltd., Hamilton, Ont.

Flavored Peanut Butter

New forms and flavors of peanut butter are being sought in research now under way at Georgia Experiment Station, Experiment, Ga.

The work is being done under contract with the Fats & Oils Branch of PMA, USDA, with 8,000 lb. of the new trial butters made up for test purposes by Cinderella Foods, Dawson, Ga.

The new peanut butters and packaging ideas are available to any food processor who is interested in trying them out.

One idea is to stuff butter of stiff consisteney into casings, which are linked to form large "sausages". In this form, the product is sliced for use as cocktail snacks, the pieces being picked up and eaten without spreading on bread or crackers.

Another idea is to package in glass jars a butter of thin consistency, that spreads very easily.

As for flavors, some now being tested are chocolate, maple and orange. Ingredients of the maple flavored butter consist of peanuts, malted milk, sugar, salt, hydrogenated oil, maple and vanilla; the orange contains peanuts, sugar, salt, hydrogenated oil, and orange oil; while the chocolate is made of peanuts, sugar, cocoa, salt, hydrogenated oil and vanilla.

"Candied" Vitamins

They're loaded—with vitamins, that is. In the form of hard candy, two of these are said to contain all the daily vitamins needed for children or adults. This product contains water-dispersible vitamins A, D, B_1, B_2, C, E, B_6, B_{12}, Niacinamide and Panthenol.

The candies are multi-colored, hard round balls looking like regular hard candies. They are packed in a $5\frac{1}{2}$-oz. glass jar with a colorful label carrying the brand name "Candavite".

Distribution is by Jackson-Mitchell Pharmaceuticals, Inc. (formerly Special Milk Products, Inc.), Los Angeles.

Skinless Sausage Links

A method for making skinless smoked pork sausage links was offered at the recent American Meat Institute meeting in Chicago by The Visking Corp., Chicago. Steps are as follows:

Grind 100 lb. of fresh pork cheeks and 200 lb. fresh pork trimmings (55 percent lean) through a 1-in. plate. Transfer to mixer, adding 7 lb. salt, $\frac{1}{2}$ oz. sodium nitrite, $1\frac{1}{2}$ oz. sodium nitrate and spice (commercial roasted sausage seasoning). Mix thoroughly. Regrind through 3/16-in. plate. Do not mix following second grinding.

Stuff and cure 36 hr. in 40 deg. F. cooler.

Next, remove from cooler and allow to stand at room temperature for 1-2 hr. Place in 100 deg. F. smokehouse for 4 hr., giving product heavy smoke. Raise temperature to 150 deg. F. and hold until internal temperature is 140 deg. F. Briefly cold-water shower and hold 1 hr. at room temperature before placing in cooler overnight.

Next morning, remove from cooler and permit product to "sweat" slightly before peeling. Pack immediately in unit packages or bulk cartons and return to cooler.

Bite-Size Saltines

A new saltine product is now being marketed by Carr-Consolidated Biscuit Co., Wilkes-Barre, Pa. The crackers have a special score down the middle which makes it possible to split each to bite-size. They are wrapped in four cellophane packs and then packaged in pound and pantry-size boxes.

Jim Nash, New York, who designed the package, has produced a display carton with clean, colorful and eye-stopping qualities. The wrap is "Kalakote", made by Kalamazoo Vegetable Parchment Co., Parchment, Mich.

Spinach With Oomph!

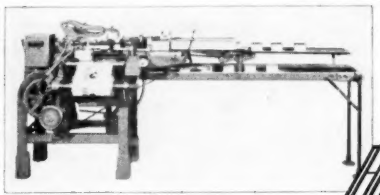
To bring out the natural full flavor of spinach, Suffolk Farms Packing Co., Revere, Mass., is inserting an envelope of "Tok", a new seasoning, in each of its cellophane packages of spinach.

This seasoning, basic ingredient of which is monosodium glutamate, comes in a neat white envelope with "Tok" spelled out in bright red letters. The contents are to be dropped into the cooking water before the housewife follows her regular recipe for cooking the spinach.

Minimum Cost Automatic Wrapping

HAYSSEN-WRAPPED

IT PAYS TO WRAP THE HAYSSEN WAY



DESCRIPTIVE LITERATURE ON REQUEST!

Hayssen
ELECTRIC EYE WRAPPING MACHINES

Automatic wrapping on the Hayssen costs less because the Hayssen requires only a modest capital investment . . . is fully automatic . . . sturdily built for a long operating life . . . and has a minimum of moving parts. Packages are trim in appearance and printed wrappers registered by Hayssen Electric Eye. Write for the Hayssen story and the name of your Hayssen representative . . . TODAY!

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.magine your dog's delight on seeing a solid column of biscuits 160′ long and 42″ wide! That's the carrying surface of this Cambridge Woven Wire Conveyor Belt in a recirculating oven at Kendall Foods Company, Bell Gardens, California.

Balanced Weave, specified for this installation, is low in cost, eliminates creeping of the belt on the drive pulley, and provides high tensile strength. Open mesh of the belt allows free circulation of heat within the oven . . . crumbs and broken bits of biscuit fall through the belt, cannot foul up automatic packaging equipment at the end of the oven.

Whether you're baking biscuits, processing meat or canning vegetables, there's a Cambridge Woven Wire Conveyor Belt to help mechanize your production. Stainless steel to meet sanitary codes is a standard material of construction for our food plant customers. Call in your Cambridge field engineer today, let him explain the superior construction features of . . .

Cambridge Woven Wire Conveyor Belts

WRITE FOR FREE MANUAL illustrating and describing conveyor belt installations for food, metal-working, chemical, ceramic and other processes.

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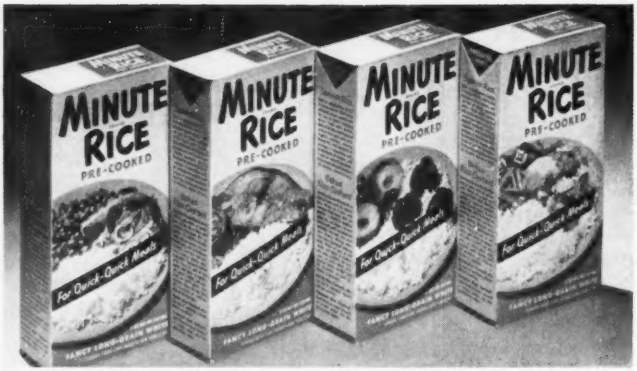

Design Features Product In 4 Dinners

General Foods, New York City, is now distributing its precooked "Minute" rice in a new colorful 5-oz. package.

Designed by Frank Gianninoto Assoc., New York City, the carton comes in four variations. The front panel features a 4-color illustration of a complete dinner plate, showing the rice accompanied by either hamburger, chicken, ham steak or salmon. Various recipes appear on the side panel. Printed on the back panel are directions for preparing rice.

The new 5-oz. package replaces the checkerboard pattern design used since the product was first introduced in 1946. For a short time the 15-oz. economy size will remain in the plaid box.

Pickled Pineapple

A new Hawaiian product—pickled pineapple—is being nationally distributed in the United States by Polynesian Food Specialities, Ltd., Honolulu.

Processed in chunks, with sugar, vinegar and spices, the pineapple is packed in 11-oz. jars under the "Surf Rider" trademark.

The label, a colorful red, blue and gold, was designed and is furnished by McCoy Label Co., Inc., San Francisco. Bottles are supplied by Owens Illinois Glass Co., Toledo, Ohio.

Make-Your-Own Sauces

"Sauce Spice" mix, a combination of 27 different seasonings, is now available to individuals who want to make their own meat or cocktail sauces.

A product of Gentry, Inc., Los Angeles, it had been available only to food processors, jobbers and distributors to the institutional trade. Now it is being packaged by some distributors in small jars for the retail market.

Present distributors offering the consumer package include American Spice Mills, Inc., Chicago, and Texas Coffee Co., Beaumont, Tex.

To make the sauce, one need only add liquids in the form of vinegar, tomato puree, or merely water. The blend requires only 12 min. cooking time at low temperatures.

Topping Cream In New Dress

To merchandise its Pennant brand marshmallow cream, called "Marshmallo". Union Starch & Refining Co., Columbus, Ind., has adopted a new re-use glass tumbler, having a ribbed handy-grip surface and an attractive new label. Latter was designed by Harry Ferrill, Chicago.

Tumblers are supplied by Armstrong Cork Co., Lancaster, Pa.; caps by White Cap Co., Chicago; and labels by U. S. Printing & Lithographing Co., St. Charles, Ill.

Retail-Size Freezer Wrap

A resale size of "Tyton Tite", Marathon Corporation's freezer wrap is now being made available to consumer trade.

It contains 60 sq. ft. of laminated wrap, packaged in a handy "cutter" type box. The metal cutting edge makes it easy for the user to tear off any desired length. The box itself is attractively designed in two shades of blue and bright red and follows the pattern of the company's Freeztex packages for frozen fruits and vegetables.

This wrap consists of two kraft sheets laminated together, plus a coating of high gloss wax. Because of its moisture-vaporproof features it provides excellent protection for frozen foods. Being very pliable it is easy to mold around meats and poultry, thus eliminating air pockets.

Keep up to date

ON NITROGEN IN THE FOOD INDUSTRIES

through LINDE

Day by day, more food processors and packers are turning to high-purity nitrogen to prevent deterioration of their products from oxidation. The improved storage quality of nitrogen-protected foods results in a wider margin of profit through less spoilage.

High-purity LINDE Nitrogen may help improve your product or simplify your process. Some of these LINDE reports may suggest ways to you:

★ "Gasometry—For Sharper Control of Food Quality" *Product shelf life improved through control of contained gases.*

★ "Investigations on the Use of Nitrogen for the Preservation of Perishable Food Products". *The "how" and "why" of food oxidation deterioration prevention.*

★ "Where Trim the Oxygen Content". *Methods for determining where and how to decrease harmful oxygen content of liquid foods.*

★ "Juice Color is Bettered by a Gas Blanket". *Nitrogen blanketing of fruit pulping operations. Applicable to vegetable products.*

★ "Relationship of Headspace and Dissolved Oxygen in Liquid Food Containers". *Sample calculations and nomographs for determining effective oxygen exclusion.*

★ "Nitrogen Protection of Edible Oils". *How to maintain peak oil quality from refinery to consumer.*

★ "Wrapper Test Promises More Shelf Life". *Simplifies choice of oxygen-excluding film for effective gas packing.*

★ "How Nitrogen Protects the Quality of Foods". *How various processors protect their products against oxidation deterioration.*

★ "Liquid Nitrogen Pulverization". *Continuous pulverization of food products, spices, without loss of volatiles, changes in flavor.*

★ "Practical Factors in Nitrogen Packing Using Flexible Film". *Machine, film, and packing requirements for prevention of food spoilage.*

Check the reports you want, tear out this advertisement, pin it to your letterhead and mail it to LINDE in New York or to the LINDE office nearest you.

LINDE Nitrogen 99.99% pure is supplied as a gas in steel cylinders, and as a liquid in tank-car and tank-truck lots. The liquid can be used for lightning-fast cooling (—320°F.), or can be converted to gaseous nitrogen as needed at the user's plant.

The term LINDE is a registered trade-mark of Union Carbide and Carbon Corporation.

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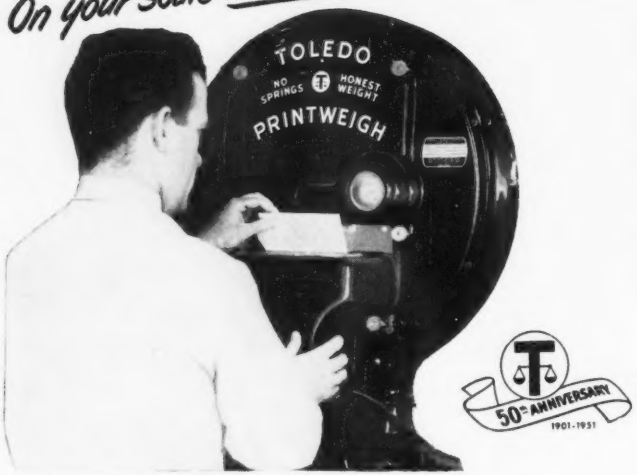

PRINTWEIGH STOPS ERRORS . . . Provides printed weight records—at the instant of weighing—assuring that the accurate indication of the Toledo dial will reach your accounting records without chance of human error.

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These are the scales backed by Toledo's half-century of experience in Research and Engineering that has produced 80% of the major advances in scales during this time.

Toledo engineering has not only specialized in the direct design of weighing machine mechanisms, but also in the many associated fields such as electronics, plastics, metallurgy, optics.

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TOLEDO

HEADQUARTERS FOR SCALES

Non-Return Soda Bottle

A 24-oz. family-size, non-returnable bottle, called one of the first used in the soft drink industry, is being marketed by Dr. Pepper Co., Dallas, Tex.

The company's regular crown is used. And for added product identification, neck and body labels are applied, since one of the features of the new 24-oz. bottle is its added space for display material. Neck labels offer printed messages relative to premium deals and other merchandising programs. One of the special offers is a "Fizz Saver" cap, attached to the neck of the bottle.

Supplier of the non-returnable bottles, Owens-Illinois Glass Co., Toledo, Ohio, worked closely with the company in developing the idea.

Tinless Cans

Two new processes for making cans without use of tin have been developed by Reynolds Metals Co., Richmond, Va.

In the one process, a roll of aluminum foil is coated with plastic in a continuous process at high speed. It is then heated to a prescribed temperature and the two thicknesses are rolled on a tube or mandrel under pressure. The number of layers rolled on determines the strength of the containers and is governed by the product to be canned. Heat is applied along the length of the roll to seal it, the metal clipped off and the can is formed, ready for the aluminum top and bottom.

In the other process, an inner and outer coat of aluminum foil is welded to a steel sheet. This is done by using three rolls of metal—two of aluminum foil and one steel sheet which has been preheated. All three are then fed through a rolling mill, with the aluminum foil under and over the steel sheet. Heat of steel and pressure exerted welds the aluminum to the sheet so that here is an outer and inner aluminum coat on the steel.

It is expected that all output will be taken up by the armed forces at this time, but will be made available to canners at a later date.

Package & Product Shorts

New Flavor Added to Dessert Line

With the addition of Coconut Cream, General Foods, New York City, has brought to five the number of Jello-O puddings and pie fillings it now offers.

Evaporated Goat Milk

Now being distributed in retail grocery stores is canned evaporated goat milk. Under the brand name of "Capri" it is being marketed in a flat topped 14-oz. can by Newcombe-Mead Co. Inc., Los Angeles.

Carrots tempting enough for dessert

Color like this—strikingly clear and realistic, perfectly reproduced by top label craftsmen! But with Muirson, you're sure of proper *follow-through*, too—because Muirson *specializes* in labels. They get designed, printed, and delivered *when you need them!* Worth investigating.

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PEOPLE have already proved that they like stainless steel table service. It's used in millions of homes and restaurants. And now there's fresh reason for even greater popularity. A number of makers have launched new designs in stainless steel, both flatware and hollowware, which rival the finest heirloom-quality table service in beauty of line and styling. But —with what a difference in practicality and usefulness!

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It is exactly these qualities—the greatest combination of strength and resistance to corrosion, heat and wear to be found in any metal commercially available today—that have made stainless steel a vital material for so many essential uses. Not only wherever food is concerned, but throughout the process industries and in hospitals, aircraft, marine use—*everywhere!* That's why we have multiplied our production of Allegheny Metal time and again, and are continuing to spend millions of dollars for further expansion. It is also why we offer every assistance to fabricators to make the best possible use of every pound.

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AL
TIME-TESTED STAINLESS STEEL

New Product?

—Continued from page 77

ing air through a diaphragm valve on the steam line. And outgoing air temperature is recorded and held within ± 2 deg. F. In addition, an automatic timing device shakes down each section of dust collector bags at 5-min. intervals.

An automatic rake in the dryer moves the powdered cheese into a screw conveyor. This feeds a gyrating sifter in the packaging room below the dryer. The product sifts into 100 lb. Leverpack drums with polyethylene linings. Repackaging into 5 lb. lined cartons follows when a product batch is finally released to fulfill a specific order. The protective lining prevents the product from absorbing moisture and effectively keeps it from picking up stray odors and flavors.

Product Is Graphed

A complete record sheet follows each batch of E-Z Cheez through the plant. Notations by the technician in charge of the setting procedure start as soon as a vat is filled. Acid titrations are made at his desk directly in the plant.

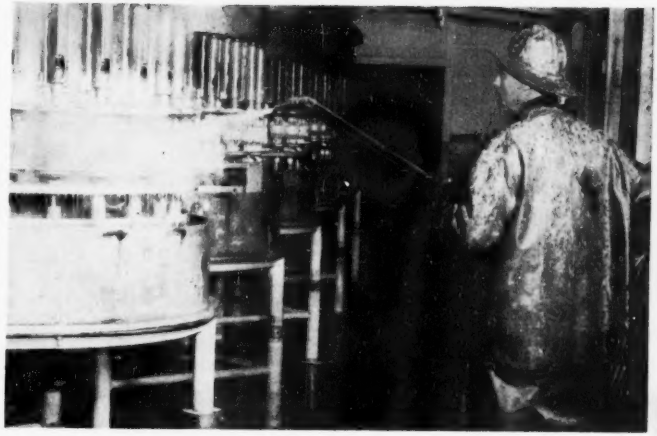
This control sheet then follows the product to the drying operation and accompanies a sample of the dried batch down to the development laboratory for further checks and final baking test. Here the product supervisor —who was also intimately concerned with the new item's development— releases the batch for sale and shipment.

Following are some of the notations which chart the processing of every batch: 1. Vat number and pounds skim milk used, 2. setting time, 3. setting temperature, 4. pounds of starter added, 5. titratable acidity and time of cutting, 6. cooking temperature, 7. protein in finished product, and 8. calculated yield.

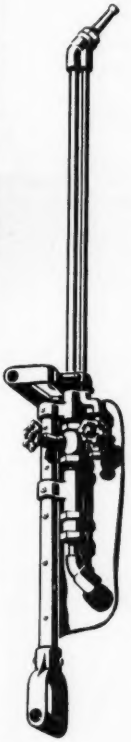
In the development lab another important check, in addition to gaging moisture and protein, is run on the finished cheese. This is the determination of its hydration number—the water absorbing quality of the powder. This must be within close tolerances to give the baker a uniform batter, for formulas using the powdered cheese are based on a definite reconstitution ratio of 2½ parts of water to 1 part cheese.

Cakes of several types are baked daily in the laboratory as a final check on the product's flavor and quality in finished goods. Disposal of these laboratory "dividends" presents no great problem.

Another vital point in the process is the procedure set up for securing bulk



Slash hours off cleaning time with this one-man crew



Here's the 481 Oakite Steam-Detergent Gun—the one-man crew that cleans up your entire plant *in half the usual time.*

No tedious scraping or scouring with this dirt-dynamiter. Just a twist of the valve and the gun fuses heat, force, powerful detergent to get under, lift off all bacteria-breeding deposits—no matter how heavy or how hard-to-reach.

Easy to operate, the Gun requires no motors, injectors, pumps. Just 30 lbs. of steam pressure, a couple of lengths of hose, and a solution container—and you've got the answer to your toughest cleaning problems. The Oakite Steam-Detergent Gun can't be beat for cleaning

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quantities of starter. Technics here need careful guarding, for the slightest contamination or change in starter strain can result in off-flavors in the finished cake.

Starter Is Guarded

One man supervises the complete handling of starter in order to maintain a strict routine. Lactic acid mother cultures are carried in the laboratory incubator under his control.

Each evening these lab cultures are transferred into fresh, sterile skim milk.

While transferring cultures to fresh medium, the laboratory technician also inoculates larger quantities of sterile skim milk, kept in stainless steel vessels, for use in bulk-starter make-up.

Bulk-starter is made in a jacketed stainless steel vat on the evening before processing. Fresh skim milk is run into this vat in the desired quantity and sterilized for one hour before it is cooled to setting temperature. Make-up starter is added and the vat is sealed and allowed to incubate under controlled temperature overnight. The following day, starter from this vat is added to the skim milk from which the cheese is made.

End (Resume reading on page 78)

CMP Tightens Squeeze

—Continued from page 139

scheduling deliveries in subsequent quarters according to necessity or desire.

This privilege, however, has been rescinded. Now if an order has not been placed on the mill schedule by your supplier for your materials prior to the seventh day of the quarter succeeding that for which the allotment was made, it is necessary to submit a new CMP-4C application for a new construction schedule and a new allotment of materials.

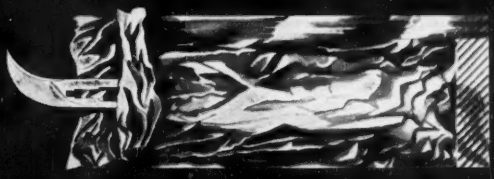
In submitting the new CMP-4c application, the following procedure has been set up: The applicant subtracts from his allotment all materials received since obtaining the allotment, whether or not by means of the allotment. The remainder is returned to Agriculture's PMA on a CMP-12 form, which was attached to the original allotment. PMA then officially retracts the materials on Form 14 and simultaneously provides a new construction schedule and allotments for the new amounts of the materials on a new CMP-13 Form.

End (Resume reading on page 141)

Where a life may hang in the balance

SPARKLING ALCOA FOIL

safeguards sterility



Either of these small aluminum packets may help to save a life. One guards the delicate needle of a hypodermic syringe; the other, the keen edge of a surgeon's scalpel. Each keeps its vital contents free from moisture, rust, contamination . . . ready for instant use.

Today, with modern packaging keeping pace with scientific progress, Alcoa Aluminum Foil plays an ever-increasing part in protective packaging. Pharmaceuticals, foods, industrial equipment, rearmament supplies . . . in each of these fields Alcoa Foil serves a growing list of manufacturers.

In view of current government restrictions, you may well ask—"Is Alcoa Aluminum Foil available for packaging my product?" Most qualified to answer this question are leading packaging firms—pioneers in protective packaging, in Alcoa Foil. May we send you their names?

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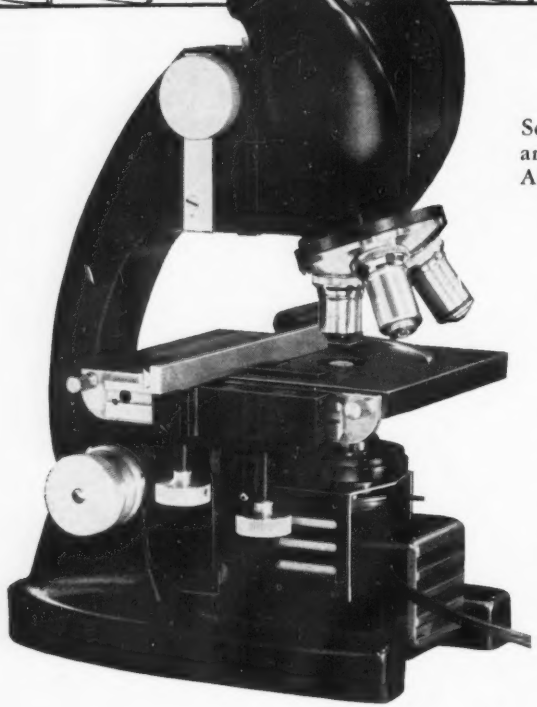

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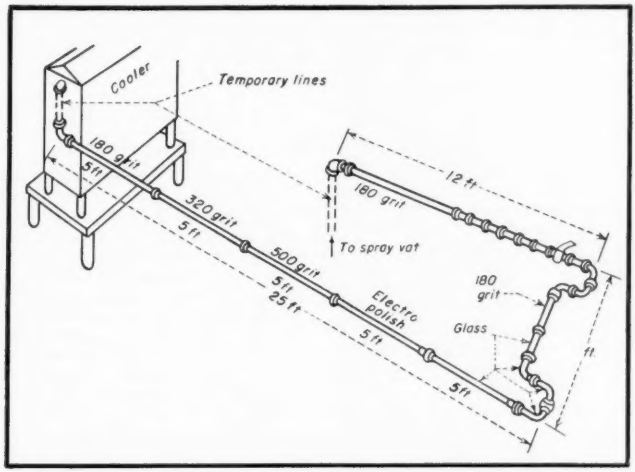
ADVANCES IN TECHNOLOGY



Experiments Show Permanently Installed Pipelines Convey Milk Products Without Contamination

That permanent sanitary lines of either stainless steel or glass are satisfactory for transportation of milk products is the conclusion of researchers at the University of Illinois Dept. of Food Technology.

A line consisting of different sections—stainless steel (180, 320, and 500 grit polish, also electro-polish), and Pyrex glass—was installed at the University Dairy and used for five months to judge the merit of a permanent pipeline on the basis of its sanitary condition and the bacteriological condition of the milk product passing through it (see drawing above).

Sections were joined with specially designed ferrules and gaskets (soft rubber for glass, neoprene and Teflon for steel). Once assembled the line was never broken into, except to make swab tests or gasket counts. Washing and sanitizing were by: (1) Flushing with 100 F. water until it ran clear; (2) circulating acid cleaning solution at 130–140 F. for 15 min.; (3) circulating alkaline solution at 160–170 F. for 15 min., and (4) circulating 180 F. water for 5 min. A velocity of 2.5 fpm. was attained during circulation of solutions and hot water.

Four methods of examination were employed: (1) Milk samples were tested for bacterial pick-up in the pipeline; (2) swabs of each type of pipe and gasket were made weekly; (3) gaskets were plated directly for mesophilic bacteria, and (4) pipes were inspected visually at the end of the experiment.

After five months, the electro-polish stainless section had a slight coating of milk solids. All other sections were as bright and clean as the original material. There was no measurable pick-up of organisms in the dairy products resulting from use of the permanent line. Swab counts on lines and gaskets were low.

Digest from "Permanent Pipe Lines For Dairy Plants," by D. R. Moore, P. H. Tracy and Z. J. Ordal, *Journal of Dairy Science*, 804-13, Aug. 1951.

Speeding Flavor Development Of Pasteurized Milk Cheese

In an effort to increase and/or intensify flavor development in Cheddar cheese made from pasteurized milk, several methods are being investigated.

Addition of acido-proteolytic organisms to milk innoculated with the usual commercial lactic cultures have, in most cases, produced no noticeable results. However, one such organism, *S. liquefaciens*, does increase flavor development, but it also produces an intense bitter flavor, in a relatively short time, and causes the body of the cheese to become soft and pasty.

Increasing curing temperature and humidity is another way of speeding flavor development. It has been found that a temperature of 65 F. and humidity of 65 percent cuts ripening time approximately in half as compared with curing at 50 F. This method brings about a definite flavor development with no off-flavor attributed to the higher temperature. More attention is required, however, to control mold growth and mite infestations at this higher temperature.

Digest from "Preliminary Studies of the Effect of Acido-Proteolytic Organisms and Temperatures of Curing on the Ripening of Cheddar Cheese Made From Pasteurized Milk," by D. D. Deane, *Journal of Dairy Science*, 776-83, Aug. 1951.

Ascorbic Acid, Sodium Citrate Ups Life of Dry Whole Milk

Storage life of air-packed whole milk powder may be increased approximately 40 percent by addition of an ascorbic acid-sodium citrate mixture to the milk before drying, and life of the nitrogen packed product can be similarly lengthened.

These are results of a series of experiments conducted at the Dept. of Dairy Husbandry, State College of Washington. Milk from the college herd was preheated at 170 F. for 30 min., condensed to 40 percent solids and homogenized twice at 2,000 and

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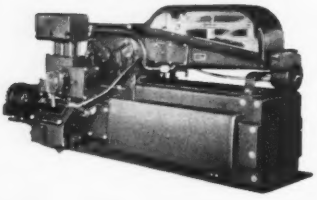
W&T MERCHEN WEIGH FEEDERS

Give Greater Product Uniformity



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M-14a

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500 psi. Each lot was then divided into 4 portions and treated as follows: (1) No treatment; (2) l-ascorbic acid (equivalent to 100 mg. per l. of reconstituted milk) added; (3) l-ascorbic acid as in (2) plus 0.1 percent sodium citrate, and (4) sodium citrate alone.

Milk was dried, packed in No. 2 flat cans—½ in air, ½ double packed in N_2—and stored at 85 F. for 1, 2, 4, 6, 8 and 12 months, then tested for flavor, ascorbic acid, peroxides, ferricyanide-reducing groups, oxidation-reduction potential, and pH.

Samples (1), (2), and (4) all exhibited flavor score losses of 1 point after 3 months in air and after 8 months in N_2. Samples (3) did not show the same losses until 5 and 12 months, respectively. The predominating flavor defect of the treated samples was staleness rather than the tallowness of the controls, and, where sodium citrate was added, a slightly salty taste resulted.

Digest from "The Keeping Quality of Whole Milk Powder. III. The Use of Antioxidants—Ascorbic Acid and Sodium Citrate," by C. W. Decker and U. S. Ashworth, *Journal of Dairy Science*, 633-40, July, 1951.

MEATS

Microbial Growth In Sausage Depends Upon Casing Used

Investigations of microbial changes in refrigerated liver sausage stuffed in plastic casings reveal that single casings of Pliofilm and Saran apparently inhibit growth, whereas considerable growth was found adjacent to the casing of Visking covered with Pliofilm.

A green discoloration developed after several weeks storage of sausage in the double casing or in a single layer of Pliofilm. Microbial growth also developed on the casing of sausage stuffed in Visking alone. Results are believed to be due to differences in permeability to nutrients of the films.

Films tested included Pliofilm 140 and 225 gage; Saran 200 gage; and Visking. The last is the most permeable to gases and water vapor, and Saran the least permeable. After the sausages were cooked and cooled, those in Visking were placed in individual envelopes of Pliofilm 140, and all were stored in a household refrigerator at 41 F. A single sausage was taken from each lot at 2 and 4 weeks.

Bacteria counts made it immediately apparent that considerable growth had occurred in sausages with the double casings, whereas there was none in those with a single casing. In the case of growth inside the casing, moisture enters the sausage from a thin layer trapped between the two films. Outside growth may be due to nutrients passing through the film from within.

Digest from "Effect of Different Artificial Casings on the Microbial Changes in Refrigerated Liver Sausage," by P. K. W. Steinke and E. M. Foster, *Food Research*, 289-93, July-August, 1951.

FATS & OILS

Evaluating Color of Oleo

The Ontario Oleomargarine Act specifies that color of oleo be not "more than 1.6 deg. of yellow or of yellow and red collectively, measured in terms of the Lovibond Tintometer scale." But measurements of color of 4 different brands of margarine, using a panel of 12 observers and 6 different sets of measurements, showed that even a single observer could be expected to obtain results differing by 0.2 units from the true value about 30 percent of the time.

To overcome this difficulty the Hunter reflectometer, a photoelectric colorimeter, was applied to margarine color measurements. Readings were taken in green, amber, and blue light, and tristimulus values calculated from them. The Hunter figures are accurate to 0.0001 in each of the chromaticity coordinates, and can be converted into Lovibond units with a final accuracy of 0.1 unit.

Application of the Hunter reflectometer method to margarines undergoing storage tests indicated that from 32-60 F. there were no important changes in color during 70 days storage. At 70 F. other deteriorative changes occurred before color was significantly affected. Parchment wrapping was found to alter color owing to surface dehydration when this wrap was used. Storage in oxygen did not affect color but exposure to ultraviolet light caused darkening of the margarine color.

Digest from "Color in Margarine. I. Evaluation of Color Using the Lovibond Tintometer II. An Indirect Method for Measurement in Terms of the Lovibond Color System. III. Effect of Storage Conditions," by Audrey M. K. Brabant-Smith, *Canadian Journal of Technology*, 290-309, June, 1951.

PACKAGING

Strength of Kraft Paper Bags Indicated by Drop Tests

When Kraft paper bags containing 7 lb. of corn flour were tested for strength under actual shipping conditions and by drop-tests in the laboratory, good correlation was obtained between the two methods.

Tests were made with fiberboard cases containing 4 bags each. These

were shipped to different parts of the United Kingdom and then returned. Distances ranged from 226 to 1046 miles. Number of bag failures was then noted. Laboratory drop-tests consisted of measurements of the height in feet and the number of drops required to cause failure in the bags packed in cases. Heights ranged from 1¾ to 3½ ft. and the number of drops from 2 to 18. Circumference of bags had a bearing on the breakage height, since the larger bags fitted the cases better and got more support from their walls.

While results of drop-tests correlated very well with transportation tests, paper-strength tests showed very poor correlation with actual performance. This is probably due to the fact that, in paper-testing, stresses are applied at low rates, while in service they are applied suddenly. Under the test conditions, 18 drops from 3½ ft. were required for failure of bags made from 0.007-0.008 in. paper, with a bursting strength (Schopper-Dalen) of 44 psi., tensile strengths of 35.2 and 14.4 psi., and resistances to tearing of 132 and 162g. in the machine direction and cross directions respectively.

Digest from "Transport Trials and Laboratory Tests on Food Containers. I. Lined Kraft Paper Bags" by R. J. L. Allen and F. A. Paine, *Journal of the Science of Food and Agriculture*. Vol. 2, No. 5, 208-17, May, 1951.

FRUITS & VEGETABLES

Byproducts From Citrus Wastes

An improved process for recovery of valuable products from waste citrus liquors and, at the same time, eliminating the problem of their disposal, was recently patented.

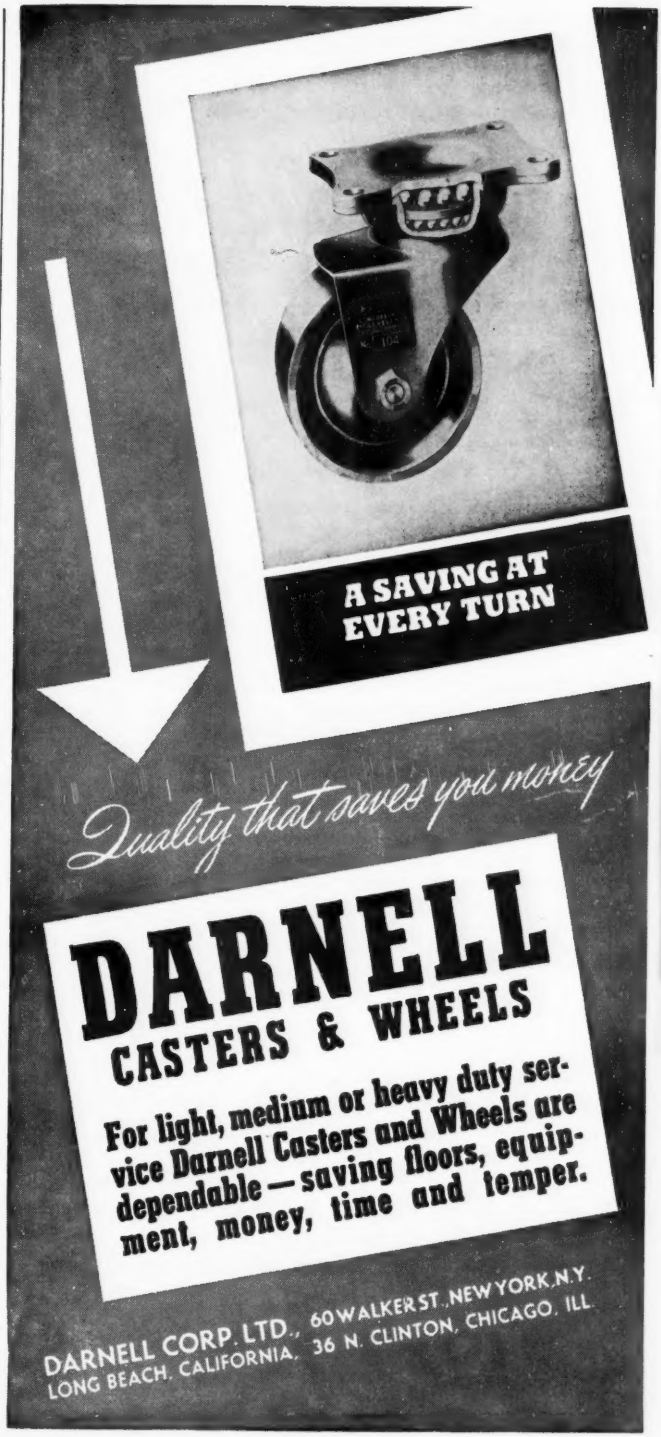
The process includes concentrating liquors to approximately 12.5 percent solids, subjecting concentrate to alcoholic fermentation and removal of the yeast. The clear beer is further concentrated and alcohol is recovered from the vapor given off. Citric acid is then recovered from the concentrate which is finally dried.

The several concentrating steps are carried out in a multiple stage evaporator in which a major part of the heat required for the first step is supplied by vapors generated in the second step.

Digest from U. S. Patent 2,561,072, issued July 17, 1951, on an application dated Sept. 16, 1946, to Gustave T. Reich, Philadelphia.

Detection of Pectin Adulteration In Jams, Jellies, Preserves

Ratios of pectin to other constituents of fruit and fruit juices are much more constant than the pectin content and hence have a high diagnostic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Starch Conveying Problem

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SPROUT-WALDRON PNEU-VAC SYSTEM

PROBLEM: To convey starch products from spray chamber to packing area. Capacity required—2000 lbs./hr. Products are hygroscopic, tend to pack and lump when exposed to high humidity air. The conveying system is used for several different products; must be self-cleaning to avoid hold-up.

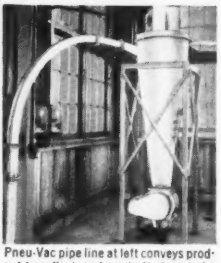
OPERATION: Dried products are discharged from drying chamber through rotary feeder valves to a 4" stainless steel Pneu-Vac pipe line. The Pneu-Vac elevates material to cyclone collector which feeds scalping screen at packing station.

Conveyor air is filtered, dehumidified by cooling, then reheated to obtain necessary low relative humidity. Operational control of the entire system is completely automatic.

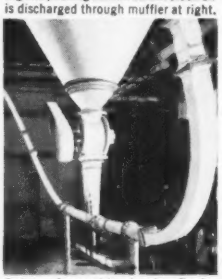
Dust which escapes the cyclone collector returns to the primary drying chamber.

RESULTS: Continuous removal of product from drier chamber is accomplished without danger of foreign matter contamination, or mixing of various products. Stainless steel construction insures product cleanliness. Loss of hygroscopic materials due to packing or sticking to conveyor surfaces is eliminated.

If you have a bulk materials handling problem, talk it over with Sprout-Waldron. PNEU-VAC may prove to be the most efficient solution. Write today to Sprout, Waldron & Co., Inc., 35 Waldron St., Muncy, Pa.



Pneu-Vac pipe line at left conveys product to collector where it discharges by gravity through feeder valve to screening and packing station below. Clean air is discharged through muffler at right.



Bottom of spray drier chamber. Feeder valve discharges starch products to 4" stainless steel Pneu-Vac pipe line.

Product from collector drops to vibrating screen and then to packing bin, from which it is drawn off in drums and multi-wall bags. Pneu-Vac pipe line carrying product from drier to collector is shown in upper left.

LOOK TO SPROUT-WALDRON for BETTER PROCESSING EQUIPMENT

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176

value in detecting adulterations. For example: the ratio of pectin to protein in fruits is equal to 1 or less, whereas in pectin preparations it ranges from 8 to 31 in liquid concentrates and reaches 143 in purified dry preparations. The most useful ratios are pectin to protein, pectin to non-sugar solids, pectin to ash, pectin to K which increase on adding pectin concentrates to jams or jellies, K to Ca, and K to Mg which diminish when pectin is added.

This method of checking is independent of the sugar concentration and does not depend on pectin determination alone. Ratios go back to purity of the fruit constituent, and added pectin is readily detected. Analyses of finished products show that it will demonstrate excessive pectin additions in samples containing less than the 0.7 percent calcium pectate.

Digest from "The Search for Pectins Added to Fruit Preserves," by A. Fouassin and R. Vivario, *Revue des Fermentations et des Industries Alimentaires* (R. Ebrant, Mgr., 193 avenue Odon Warland, Bruxelles, Belgium), 75-87, June, 1951.

CONTROL METHODS

Accurate Lactic Acid Test

Color developed on addition of ferric chloride to filtrates from milk precipitated with barium chloride, sodium hydroxide, and zinc sulfate solutions, is an accurate measure of the lactic acid present in the sample. The color may be measured with a Lovibond tintometer, a Spekker absorption meter, or a colorimeter, and the lactic acid content taken from a curve prepared from standards. Agreement with the much more lengthy p-hydroxyphenyl method is good.

For rapid screening of milks, three reagent solutions containing different quantities of ferric chloride may be added to the zinc filtrates. From the colors developed, selected samples may be subjected to more precise measurement. Freshly drawn milk had a mean apparent lactate content of 0.003 percent by the method. Cows in advanced lactation may give milk showing higher apparent lactate up to a maximum of about 0.007 percent.

Digest from "The Determination of Lactic Acid in Milk," by E. R. Ling, *Journal of the Science of Food and Agriculture*, 279-288, June, 1951.

Beer Color Measurements

The principle of color comparison, using standard glasses, is physically and psychologically superior to comparison of transmitted light intensity, as must be done with a photoelectric instrument. But for brewed products,

a more rational series of glasses than the old Lovibond series 52 is needed. For ales and beers, a series of glasses based on the colors of dilution of worts, beers, and caramel solutions is proposed. It contains more red in the higher numbers than the old glasses and is based on the equation, $Y = 2.5R + 0.32 R^2$ (Y = yellow, R = red). The proposed scale has 27 units and is practically identical with the 52 series below 6 deg. L.

The potassium dichromate scale for beer color is much too yellow, and diverges from the Lovibond from the start. The iodine scale is satisfactory up to about 6 deg. L., then diverges rapidly into colors that are too yellow. The dye standards of the American Society of Brewing Chemists are in good agreement up to about 15 deg. L. in the new series, but may be a little more red in the range 3-10 deg. L. The method of developing a satisfactory color scale by dilution of products to determine the curve of color proportions, size of color units, and range of units, should be applicable to other fields where the Lovibond principle is used—oils and shellacs, for example.

Digest from "Proposed Revision of the Lovibond '52 Series' of Glass Slides for the Measurement of the Colour of Worts and Beers" by L. R. Bishop, *Journal of the Institute of Brewing*, 66, 373-82, Nov.-Dec. 1950.

CEREAL PRODUCTS

Vitamin A Stability

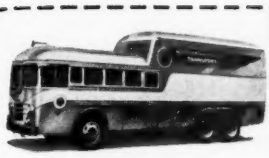
Seven dry vitamin A concentrates that are said to improve stability in feeds, were tested in a mixture of corn meal, soybean meal and glucose. Concentrates were either oils or carotene stabilized in various ways, some containing other vitamins and protected by wax or lipide coating of the particles. Vitamin A content of the concentrates varied from 150 to 1,500 μg. per g.

After 6 months storage in the dark at room temperature, feeds containing the concentrates had retained 60-85 percent of their original vitamin A content. Mixtures containing vegetable meals or antioxidants survived best. Soybean oil meal (expeller) improved vitamin stability; ground yellow corn was less effective, and glucose diminished stability.

Digest from "Stability of Dry Vitamin A Concentrates," by M. J. Burns and F. W. Quackenbush, *Industrial and Engineering Chemistry*, 1592-93, July, 1951.

Drying Stored Grain

Removal of moisture from grain stored in vertical bins or silos by establishing a downward current of air through the mass and exhausting it



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Naturally with the economies that this company enjoyed through the use of LUBRIPLATE Lubricants on worm-axles, they extended the use of LUBRIPLATE to other parts of their equipment. The savings in parts, time, money and increased efficiency are equally startling. Let us send you the entire report of where they are now using LUBRIPLATE and what it is saving them.

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LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE Product best for your every lubrication requirement. Let us send you CASE HISTORIES of savings that others in your industry are making through the use of LUBRIPLATE Lubricants. Write today.

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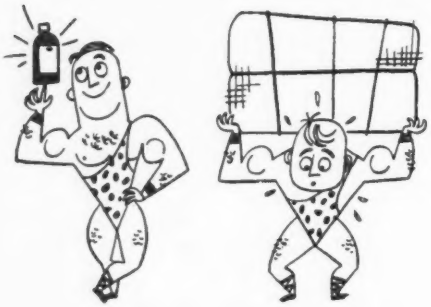

● Samson made an unshakable place for himself in history by hefting mighty objects, and strong men the world over have since labored to emulate him. But the modern food processor and manufacturer of dry and liquid seasonings is seldom naturally equipped for such activity. Therefore to transport and store the heavy, awkward bags of spices his products require, he must perforce hire warehouses, trucks and several muscular, 20th century Samsons!

◑ Not so the manufacturer who has discovered **SPISORESINS!** For **SPISORESINS** require no more space than the neat, compact essential oil bottles on his plant shelf, and are as easy to use. Pourable, of superior flavor value, entirely free of mold and yeast spores, **SPISORESINS** simply eliminate the storage problem. A 5 lb. bottle of **SPISORESIN** Black Pepper is equal in flavor value to a 150 lb. bag of the spice itself. Solvent extractions of natural spices, **SPISORESINS** are available in all important Basic flavors and over 60 different Compounds.

● Give your products a "taste-lift"—your entire operation a "convenience-lift". Let the small bottle of **SPISORESINS** retire the extra warehouse, the truck, the sanitation problem, and the "Samsons" to the glorious, but inconvenient, past.

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D&O

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to the atmosphere is the object of a recent invention.

The air movement is accomplished by means of channelways formed in the floor of each bin. These channelways connect with a central duct that surrounds the grain discharge opening. They radiate outward and upward to the walls of the bin, and are covered with screens containing elongated slots. The central duct is connected to an exhaust fan which discharges through a pipe into the atmosphere.

When it is necessary to dry grain stored in the bin, the exhaust fan is put in operation and air is drawn down through the grain and into the channelways. From here the air passes into the central duct, then to the fan and, finally, to the atmosphere. Operation is continued until exhaust air shows that desired moisture level has been reached.

Digest from U. S. Patent 2,561,141, issued July 10, 1951, on an application dated June 21, 1948, to J. F. Tipps, Memphis, Tenn.

BEVERAGES

Stable Chocolate Drinks

Production of a water-base, chocolate flavored drink in which the cocoa butter is in a stable emulsion and, therefore, does not rise to the surface, is the object of a recently patented invention.

Crux of the process is bromination of the cocoa butter to increase its specific gravity to 1.02-1.04 (approximately that of the chocolate drink) and then encasing it in an organic emulsifying agent. This latter is accomplished by high pressure homogenization of a mixture of brominated cocoa butter (or cocoa butter brominated to a higher sp. gr. and untreated cocoa butter, or chocolate liquor), water and emulsifying agent.

For commercial use, the emulsion is combined with a concentrated chocolate syrup and simple syrup. Finished drink is made by adding lightly carbonated water to syrup in the bottle. Process can also be applied to the manufacture of coffee flavored beverage by replacing part or all of the cocoa in the syrup.

Digest from U. S. Patent 2,556,792, issued June 12, 1951, on an application dated Nov. 14, 1949, to F. M. Boyles, Baltimore, assigned to Cloverdale Spring Co.

Beer By Tank Trucks

Transportation of draft beer in tank trucks to taverns and restaurants serving large quantities is being practiced by a large Westphalian (Germany) brewery.

Tanks are of stainless steel or glass-

line steel, and are well insulated. In the tavern cellar a similar, but uninsulated tank is erected and an insulated filling line leads to a convenient location for unloading the tank truck. The transfer is made isobarometrically, the CO_2 from the cellar tank returning to the truck through a gas line.

An accurate meter that records the quantity of beer transferred to the tavern's cellar tank is part of the truck equipment. A gage glass shows the customer the approximate volume delivered, and permits him to estimate the quantity of beer remaining in the tank at all times. Some installations may require a small CO_2 compressor to reduce cellar tank pressures before filling, or the extra gas can be blown off and the tank recharged from a steel bottle of CO_2.

In order to reduce the effects of the varying hydrostatic head, that might alter the beer's foaming properties and gas content, cellar tanks should not be filled to a depth of more than 5 ft. The tanks should be equipped with a manhole in the cover, and be designed to permit thorough and easy cleaning. Initial installation costs are high, but the savings in shipping and handling barrels are so great that they are expected to pay off rapidly. Extension of the idea to rail tank cars of 170 bbl. capacity, possibly with solid CO_2 refrigeration, is considered a logical next step in the development.

Digest from "A New Beer Shipping Method Using No Barrels," by Edmund Stevens, *Brauwelt*, 1951, No. 18, 345-6.

MISCELLANEOUS

Egg Powder Keeps Longer When Packed In CO_2

That CO_2 is a more effective gas-packing agent for spray dried whole egg than N_2 is indicated by results of experiments conducted recently in Australia.

Spray dried egg powders of medium moisture content were packed in air, N_2 and CO_2, then stored at 50-86 F. to determine flavor and solubility changes under these atmospheres.

Packing in CO_2 increased storage life of powders by 5 weeks at 86 F., 20 weeks at 68, and 44 weeks at 50, when compared with air-packs. N_2 packing showed a very small increase at 86, approximately 20 percent at 68 and 10 percent at 50 F. Results of solubility tests indicated that gas-packing was even more effective than the palatability results.

Digest from "Gas Packing of Spray Dried Whole Egg Powder," by A. R. Prater, *Food Preservation Quarterly* (Homebush, New South Wales, Australia), 69-71, Dec. 1950.

—End

OIL AND GAS BURNING EQUIPMENT FOR EVERY INDUSTRIAL APPLICATION

Whether you burn pitch, tar, oil, gas or a combination of these fuels, there's a NATIONAL AIROIL BURNER for your job.

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OIL BURNERS and GAS BURNERS for industrial power, process and heating purposes; STEAM ATOMIZING OIL BURNERS; MOTOR-DRIVEN ROTARY OIL BURNERS; MECHANICAL PRESSURE ATOMIZING OIL BURNERS; LOW AIR PRESSURE OIL BURNERS; GAS BURNERS; COMBINATION GAS and OIL BURNERS; AUTOMATIC OIL BURNERS, for small process furnaces and heating plants; FUEL OIL HEATERS; FUEL OIL PUMPING and HEATING UNITS; FURNACE RELIEF DOORS; AIR INTAKE DOORS; OBSERVATION PORTS; SPECIAL REFRACTORY SHAPES.

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(For use where steam is available) *atomizes thoroughly* and *burns completely*, the lowest and cheapest grades of fuel oil and tar, requiring only low oil pressure and temperatures. Send for Bulletin No. 21.

TYPE "S-A-L"

(Large capacity burner similar to TYPE "S-A-R") is adaptable in combination with powdered coal burners in large boilers. Send for Bulletin No. 24.

TYPE "S-A-R"

(Where steam, or gas is available for atomizing (safely and efficiently burns residuums obtained from process. Send for Bulletin No. 23.

COMBINATION GAS AND OIL BURNER

—the "AIROCOOL" Gas Burner in combination with a TYPE "S-A-R" Oil Burner. Send for "AIROCOOL" Brochure.

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(Of venturi type), assures low turndown without burnback. Send for "AIROCOOL" Brochure.

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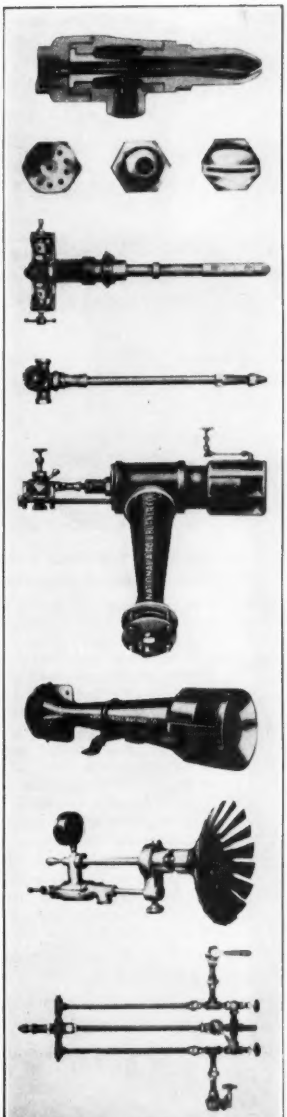
(Refuse Oil Burner) burns acids or caustic oils, sludges, asphalts, tank bottoms, polymer oils, heavy petrolatum, organic oil residuums, waste cutting oils, sulphite pulp liquors, tars, pitches, etc., in combination with fuel oil. Send for Bulletin No. 21.



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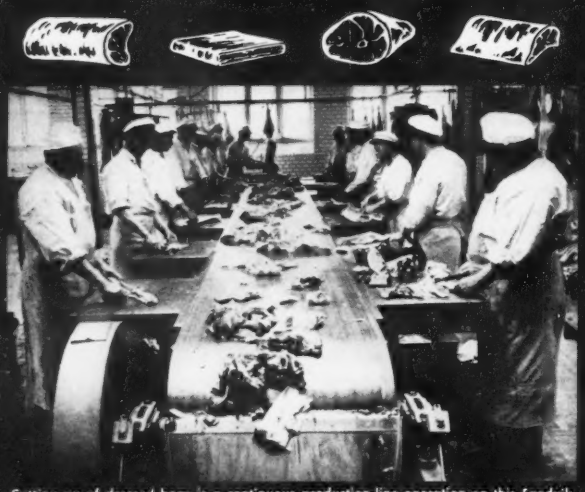
This Pork Production Line Uses A SANDVIK *Steel-Band* CONVEYOR TABLE



Cutting up of dressed hogs is a continuous production-line operation on this Sandvik work table. Sides are sawed into large cuts at far end of conveyor and each man along line performs a specific subsequent operation.

CONVEYING WORK TABLES OF COLD-ROLLED STAINLESS STEEL IMPROVE PROCESSING OF MEAT, FISH, VEGETABLE AND BAKERY PRODUCTS

You can apply cost-cutting, mass production methods to your operation with a Sandvik conveying table.

Right now, Sandvik work tables are minimizing costs in operations such as bacon and frankfurter packing, chicken eviscerating, hamburger preparation, tenderizing, cake-icing and packing, ham-boning, pork rolling, fish fileting and packing, vegetable, fruit and nut sorting, etc.

Here are some reasons why:

- **EASY TO KEEP STERILELY CLEAN**—Live steam or boiling water can be applied directly.
- **NO TASTE CONTAMINATION**—A hard, smooth surface... no place for food particles to lodge.
- **LONG SERVICE LIFE**—High strength and resistance to time and wear.
- **ENGINEERED TO FIT APPLICATION**—Lengths to meet any requirements.

Standard work table widths are 20" and 12", but special widths are also available. Correct working height can be arranged despite special floor conditions. Special, custom-built units also available.

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SS-75

Buy or Lease Trucks?

—Continued from page 135

Cab, motor hood, wheels and fenders are of the same blue. Body lettering is red.

It is to be noted that the body displays are not all alike—the panel areas being used to advertise individual frozen food items sold, both by a reproduction of the package unit and lettering accordingly.

Frigid Dough and Honor Brand are two of the house-line packages shown. Frigid Dough is a trade name used for frozen bread dough, pies, rolls of cloverleaf, cinnamon and raisin type, and other pastries. Honor Brand is the trade name for the frozen fruits, vegetables and concentrates handled by the company. Also carried are specialty items of frozen meats, fish and poultry.

The leased trucks are used to deliver the frozen food products over the entire metropolitan Chicago area. Sales are made to grocery stores, bakeries, restaurants and hotels.

Will the *overall* cost of leasing run to a higher figure than would be entailed by outright ownership and maintenance of the trucks? On this question, the company is of the opinion that the net leasing cost may be less when there is taken into account all of the executive supervision required in the maintenance of a "home owned" fleet and not generally included in the cost of such an operation.

Executive supervision covers such matters as truck selection and purchase; trade-in details, as older trucks are replaced with new ones; the purchase of gasoline, oil and tires; maintenance of garage and repair shop; purchase and storage of repair parts, general supplies, gasoline, oil and tires; handling of truck fire and liability insurance; and dealing with a mechanics' union each year when contracts come up for renewal.

This supervision requires the services of at least a part-time purchasing agent. Also, there is a considerable amount of bookkeeping work. Taken all in all, these many factors may be said to put the company in the truck maintenance business—whereas in this case the main activity of the company is to distribute various frozen food products.

Eliminates Hidden Costs

Under the lease, however, Willetts—a company principally engaged in truck maintenance—takes care of all the troublesome supervision, purchasing, storing, repair work and bookkeeping. And the total service is expressed in one item to the Chicago Frozen Food Co.: Namely, the weekly charge per

truck for the given number of miles run, with an addition for any extra miles.

With the weekly truck mileage remaining fairly constant (unless some change is made in the route area), the food concern is able to predetermine its distribution expense.

Furthermore, with the mileage consistent, the distribution expense also runs fairly consistent. That is, it's not subject to violent fluctuation such as occurs in the maintenance of a company-owned fleet when, in a given month, an unusually large amount of repair-work is done or an inordinate expenditure is made for tires, parts, or supplies.

Also, in the case of the Chicago Frozen Food Co., the capital which would have gone for trucks can be employed in the principal business of buying and selling various frozen food products.

The Willett Co. has specialized in providing more than 60 trucks to companies in the frozen food field in Chicago, also leasing vehicles to Lafayette Foods, Inc., distributor of Libby's frozen foods; Great Lakes PictSweet Distributors; and Snow Crop Marketers. In the latter case, it supplies the drivers as well as the trucks.

End (*Resume reading on page* 137)

Stretching Stainless

—*Continued from page* 63

with scalding hot water to remove all juice, pulp and sugars. This is followed by a second hot flush, using a solution made up with a carefully selected commercial detergent-sanitizer that combines both a cleaning and a sanitizing action of completely non-abrasive character.

The solution is permitted to act for about 20 min. and is then rinsed free with a third hot flush. Because the solution is not abrasive, it may be safely run through all lines, pumps, and instruments. Spot inspections of possible trouble points then insure that the treatment has been effective.

Outer portions of the equipment are washed down by standard methods and inspected to make sure that all working surfaces—for example conveyor belt links—are free of juice or concentrate. Where required, such parts are prelubricated for the next day's run.

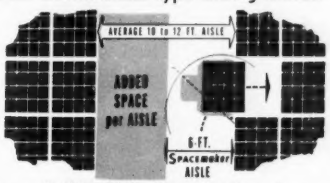
Once a week all lines, valves, and pumps are disassembled. Valves and pumps are cleaned, inspected for signs of wear or corrosion, and reassembled. Fittings and tubes are placed in a wash sink and their inner walls thoroughly scrubbed with a sterilizing-de-

ADD 1/3rd MORE SPACE

NOW TO YOUR EXISTING STORAGE FACILITIES

with the RAYMOND SPACEmaker ELECTRIC TIERING TRUCK

How wide are the storage aisles in your plant or warehouse . . . 10 feet . . . 12 feet? If so, you're wasting up to one-half this width making room for conventional-type tiering trucks!



The new RAYMOND SpaceMaker does away with waste aisle space — increases your storage capacity by as much as ⅓. It's a rider-type tiering truck that actually right-angle tiers loads 130" high from aisles only 6-ft. wide. Just look at these SpaceMaker advantages:

● **STACKS FROM 6-FT. AISLES** Exclusive RAYMOND design eliminates counterweight, shortens overall length. Result: SpaceMaker tiers loads from 6-ft. aisles — permits one extra row of storage for each aisle now in use.

● **MANEUVERS LIKE MAGIC** Offset drive wheel produces 200° turning arc — enables SpaceMaker to maneuver in aisles narrower than its own length with load.

● **WEIGHS SO MUCH LESS** Compact construction plus no counterweight result in far lighter truck. Thus, SpaceMaker operates in low-capacity elevators, on lighter-capacity floors — has lower battery capacity requirements, costs less to run.

● **WRITE TODAY FOR BULLETIN 703** — it tells the complete SpaceMaker story. And ask for a SpaceMaker demonstration — you have to see it to believe it!

Pioneers Since 1840

RAYMOND

SpaceMaker Model E2ST Straddle-type, telescopic tiering truck. 2000-lb. capacity.

The RAYMOND CORPORATION
Formerly LYON-Raymond Corporation
6250 Madison St., Greene, N.Y.
Gentlemen: Please send me Bulletin 703 on your new SpaceMaker Electric Tiering Truck.

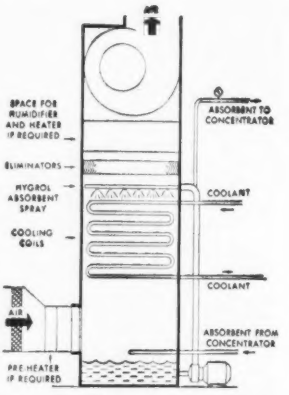
Name_____ Title_____
Company_____
Street_____
City_____ State_____

How You Save with the NEW Niagara Method of Air Conditioning

Using "Hygrol" Absorbent Liquid

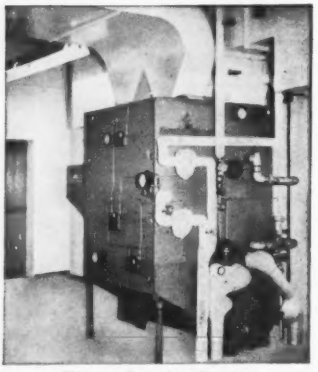
Because it absorbs moisture from the air directly, the new Niagara Controlled Humidity Method uses less, or no, mechanical refrigeration for dehumidifying. You save first costs and installing of heavy machinery. You save space, maintenance expense, power. You get easier, more convenient operation.

Using "Hygrol" hygienic absorbent liquid, this method gives complete control of temperature and relative humidity. Especially, it is a better way to obtain dry air for drying processes, packaging hygroscopic materials, preventing moisture damage to metals, and obtaining better quality for chemical process products and food products—or in obtaining better results in comfort air conditioning for office or laboratory at lower refrigeration costs.



NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM

Food Packaging under Controlled Humidity


Niagara Controlled Humidity Air Conditioner

The diagram shows how filtered air is dehumidified by passing thru a spray of "Hygrol"—a liquid absorbent which removes air-borne moisture. This liquid is hygienic and non-corrosive; it contains no salts or solids to precipitate and cause maintenance troubles. It is continuously re-concentrated at the same rate at which it absorbs moisture, providing always the full capacity of the air conditioner, automatically.

Units provide a range of capacities from 1000 to 20,000 C. F. M. Multiple unit installations are in use successfully. Records of results are available. For further information, write Niagara Blower Co., Dept. FI, 405 Lexington Ave., New York 17, N. Y.

tergent. (In assembly, pre-sterilized Neoprene rubber gaskets are used.)

At this time all tanks, except the liquid sugar storage tanks, are entered, brush-cleaned and sterilized. Agitator seals are inspected and cleaned. All orifices and weld seams are examined to detect any signs of trouble. The mechanical action of all portions of the machinery is checked and minor defects corrected.

Stainless Fastenings Used

Major repairs and alterations are scheduled during the monthly shutdowns. Much of this work is handled by outside specialists, assuring expert workmanship. Whenever possible, however, corroded parts are replaced by the plant maintenance crew, using stainless steel. Today, many of the screws, nuts, bolts, fastenings, holding pawls and other parts, made originally of carbon steel, have been replaced with stainless. The plant crew also performs all major lubrication tasks.

In the basement of the plant are four stainless steel tanks (3,000 gal. capacity each) for the storage of liquid sugar having a slight, but active acidity. These tanks are maintained under continuous protection against corrosion.

To prevent spoilage of the sugar and any increased acidity from bacterial action, each tank is equipped with a 30w. germicidal lamp. To remove condensation, each tank has a sealed-bearing air blower (mounted inside the head) that operates 24 hr. a day.

In combination with stainless steel, these two devices maintain the sugar in top condition with minimum metallic pickup or bacteriological contamination. Then twice a year the tanks are emptied, cleaned, and inspected, in a matter of a few hours. No sand blasting or recoating of the interiors, as with storage tanks of ordinary design, is required.

Same Methods Applied in Stores

The technics developed in the plant have been equally effective when modified and applied to the stainless food-service equipment used in Nedick's stores. In this instance, district and store managers work out a cleaning and maintenance schedule. Periodic inspections are made and defects reported to the maintenance department.

Through these means we have been able to keep our name high on health department honor lists and at the same time prevent lengthy and expensive shutdowns and repairs. We estimate that we are obtaining maximum service from our stainless equipment, utilizing its properties to best advantage in producing a highly saleable product at minimum cost.

End (*Resume reading on page* 64)

Questions & Answers

THIS MONTH'S PROBLEM

Question—A gelatinous sediment settles in our liquid coffee concentrate after it thaws. This gel formation does not alter the flavor of the coffee, but it does impair the appearance and the flow charactertistics of the product. Our concentrate is a pure coffee with no added carbohydrates. And we attain our desired concentration of 24 percent solids by step-wise extraction. Can you advise us regarding the cause of this sedimentation and suggest a remedy?

Answer to September Problem

The Question Was—Can you suggest any methods for prechilling flour employed in making cake batters? We'd like to chill our flour low enough so that the temperature of the batters will be about 70 deg. F.

Answer—More feasible than prechilling the flour is to cool the water used in a cake-batter formula. Reason: Flour is an excellent insulator and its rate of heat transfer is low. Then, too, flour has a lower specific heat than water. The specific heat of flour is 0.40. The corresponding value for water is 1.00.

In most cake formulas there is actually more water than flour. But let's assume that only equal parts of flour and water go into a batter and the temperature of both ingredients is 80 deg. F. Then, ignoring friction and room temperature, it is possible to come up with a 70 deg. F. batter by lowering the water to 66 deg. F. On the other hand, if only the flour is chilled, it would have to be cooled to 41.5 deg. F. to produce a 70 deg. F. batter.

A simplified formula often used for calculating the temperature of water used for mixing bread dough follows: Multip'y corrected dough temperature by 5, then subtract flour temperature multiplied by 2. And finally divide the answer by 3.

The corrected dough temperature equals the desired final dough temperature, less the rise in temperature that occurs during mixing.—*R. W. Selman, R. W. Selman & Associates, Kansas City, Mo.*

Editor's Note: A new method developed at Drake Bakeries, Inc., Brooklyn, N. Y., produces a 70-deg. F. cake batter by prechilling liquid sugar. See article "Two New Processes Engineered to Produce Better Quality Cakes" *October FE.*

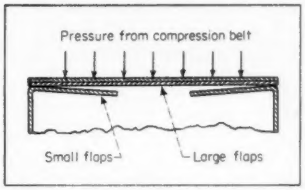


FIG. 1—PRESSURE of compression belt does not bring flaps in contact. Result: Poor sealing of carton.

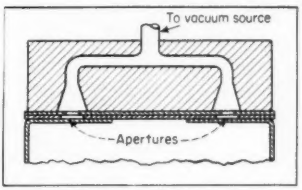


FIG. 2—VACUUM pulls top and bottom flaps together, thus insures perfect sealing of carton.

Powders Sifting From Cartons

Following is another answer to the August question concerning complaints in respect to the sifting out of dessert powder from packages.

Answer—If the cartons in question are of the seal-end type, the manufacturer is undoubtedly having closure difficulty. After flaps are glued and positioned, the cartons travel through moving compression belts. Naturally, one would assume that pressure of the top-sealing belt would be sufficient to secure a tight closure. Unfortunately, this is not true, for the very pressure that is

How Would *You* Do It?

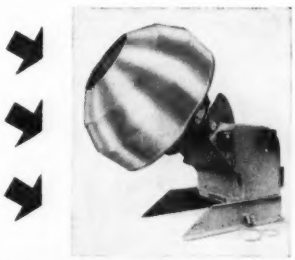
Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We underake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

NO SCOOPING SCRAPING



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The exclusive Ransome baffle design directs ingredients into two merging, fan-shaped formations . . . assuring a thorough mix in less time. The drum is *rotated* by motor and *tilted* by motor—and discharges, automatically and *completely*, as clean as a whistle.

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That's what companies all over the nation are doing to keep up with increasing Defense requirements. And here are some typical reports from users:

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"On one operation, productivity per man-hour has increased 12½ times. Instead of handling 4,000 lbs. per man-hour by manual means, we now handle 50,000 lbs. with the aid of industrial trucks."

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"Since adding industrial trucks, production machines are kept constantly supplied with materials in such quantities that production downtime due to a lack of materials has been eliminated."

PUBLIC WAREHOUSE

"We have gained an average of 25% to 35% better utilization on man-hours as a result of installing industrial trucks for loading, unloading and storage work."

STEEL WIRE COMPANY

"With industrial trucks, we have speeded up the flow of materials all through the mill. Results: existing machinery can now be used at fullest capacity, production has increased, product unit-cost is lower."

IN ANY INDUSTRY

Powered industrial trucks can help you obtain better production records and increase your workers' productivity. Ask your industrial truck sales engineer for information about case histories in *your* industry.

THE INDUSTRIAL TRUCK ASSOCIATION

3701 NORTH BROAD STREET · PHILADELPHIA 40, PA.

supposed to seal the flaps does the very opposite.

Pressure of the belt does not bring all flaps in tight contact to effect a good seal. The pressure belt deflects the two small top flaps downward and away from the under surface of the long inner flap. (See accompanying Fig. 1.) Obviously, since pressure cannot be exerted on both top and bottom of the flaps after the carton is closed, it is impossible to get a perfect seal. This does not mean that every carton will leak. But the percentage of leakers can, as in this case, be of great concern to the packer.

The writer has patented a vacuum sealing method (Fig. 2) for obtaining a perfect seal at the rate of 100 to 300 cartons, depending upon the size of carton and type of sealing machine. This new method eliminates the compression belt and it only requires a converted rotary-type vacuum-filling machine.

In operation, apertures must be cut through the two long top flaps but not through the two small ones. These apertures may be slits, circular holes, or perforations disguised as codes or company initials. For registration purposes, the openings of the innermost long flaps are larger than the outer ones.

After the flaps are glued and positioned, the carton goes under the vacuum-sealing head, where it is immediately sealed. —*William J. Cupo, Wood-Ridge, N. J.*

Freezing Time Too Long

Question—It takes us 6 or 7 hr. to freeze loose peas in trays in a Murphy-type quick freezer, which employs both conduction and air blast to remove the heat. We know that other companies freeze peas in metal trays in 1½ hr. in a freezer of this type. Our freezer operates at the correct temperature and with adequate air circulation. The only peculiarity we can detect in our operations is the fact that our trays are made of thin and somewhat flexible metal. These, however, should conduct heat as rapidly as heavier gage trays. Can you suggest any steps that we might take to reduce freezing time?

Answer—We advise that you carefully examine your thin-gage metal trays to determine whether the bottoms are flat and are making good contact with the freezer plates. We know of one instance where conduction freezing was performing unsatisfactorily because the tray bottoms were bent and contact was made at only three or four points. As a result, there was an air space between most of the tray bottom area and the freezer plate. This acted as insula-

tion, thus greatly retarding the rate of freezing.

It may be, also, that you are loading the trays too heavily. If the layer of peas is thick, considerable time naturally will be required to reduce the center of the layer to freezing temperature.

Vitamins in Citrus Peels

Question—Is there any truth to the statement that citrus fruit peels contain as much vitamins as the juices themselves?

Answer—Citrus juices generally are regarded as very convenient sources of vitamins C and P. However, the peels of citrus fruits are much richer in these vitamins than their juices. Total amount of vitamin C contained by reaming the juice without the peel is 31 percent.

Vitamin P, or citrin as it is sometimes called, is a mixture of glucosides of previously known flavonone derivitives (hesperidin and eriodictyol). This vitamin is known to have partially alleviated certain skin diseases and to be useful in treatment of hardening of the arteries.

Hazy Wines

Question—We have a curious problem: Some of our white wines become turbid in the bottle, but they quickly become clear on uncorking. Can you tell us what is happening?

Answer—The turbidity is most likely caused by copper. Occurring in the presence of only 0.5 ppm. of the metal, this haze forms when conditions favor the reduction of copper to the cuprous state. In a storage cask, where a limited amount of air is present, the wine remains clear, since aeration is sufficient to keep the copper from becoming reduced to the cuprous state.

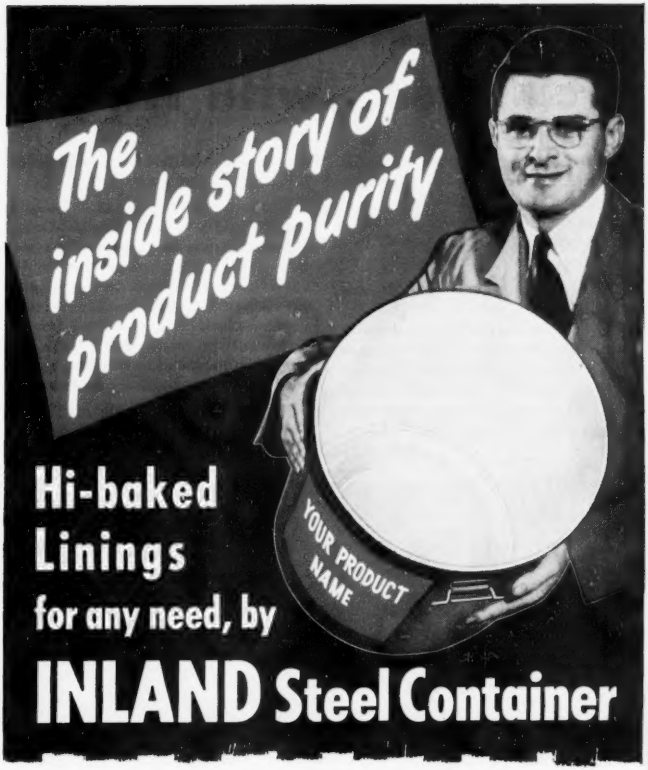
When wine containing copper is bottled, it gradually becomes turbid due to the reduction of copper, and it clears again if it is kept uncorked for some time.

An old remedy is to treat the wine with tannin and skim milk.

More on Cranberry Sauce

Referring to your August Q&A, "How to Make Cranberry Sauce," there are certain recommendations that are not consistent with current manufacturing practices.

One part of sugar to an equal part of the original berries, by weight, should be used. And the sauce should be cooked to 39–40 percent soluble solids and not 50 percent.—*Arthur S. Levine, Associated Professor, Department of Food Technology, University of Massachusetts.*



This inside story is no secret to experienced container buyers. They know how often Inland Steel Containers, with scientifically developed hi-baked linings, supply the answer to their special problems . . . how perfectly they protect the purity, flavor, color, or other vital qualities of their products.

The chances are, Inland specialists have already developed the ideal lining to keep your product fresh and pure. However, if your needs are special, Inland Steel Container's laboratory facilities, trained experts, and years of specialized experience are at your service.

Bring your problems to us and find out why so many buyers say, "It's better to ship in steel, and best to specify Inland Steel Containers!" Write for complete details.

Pails and drums in sizes from 3 to 55 gallons, with a variety of closures. Available with colorful Inland lithography or printing for added sales appeal.

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A-14

Gets longer bearing life, better bearing closures...with TIMKEN® bearings

BY switching to Timken® tapered roller bearings for the vital worm shaft and worm gear shaft applications on their food shaper, Automatic Food Shaping Company solved two problems at once.

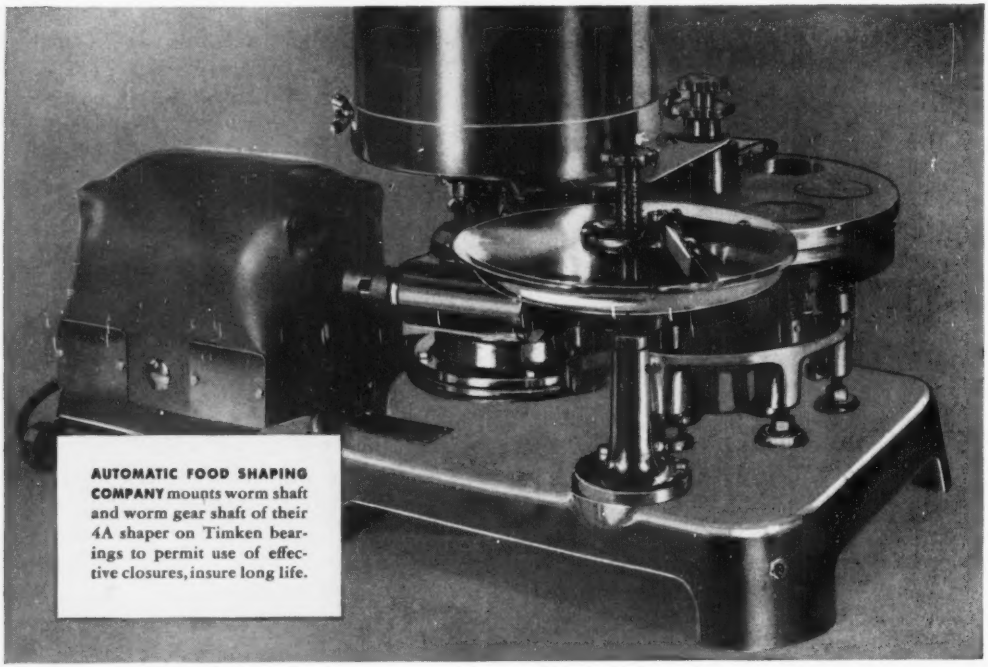
The bronze bushings formerly used had to be replaced too often. And they did not permit use of effective closures which would keep lubricant from contaminating the food. With Timken bearings—used on the shaper for the past seven years—bearing replacement has been eliminated and rubbing type seals which effectively retain lubricant can be used.

Timken bearings make closures more effective because they hold housings and shafts concentric. They take both radial and thrust loads in any combination. Because of line contact between rollers and races, Timken bearings have load capacity to spare. Friction and wear are minimized by the true rolling motion and incredibly smooth surface finish in Timken bearings.

Because they are made of Timken fine alloy steel, precision manufactured, and engineered for the job, Timken bearings normally last the life of the machine in which they are used.

Always specify Timken bearings in the machines you build; look for them in the machines you buy. Be sure the bearings you use carry the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



AUTOMATIC FOOD SHAPING COMPANY mounts worm shaft and worm gear shaft of their 4A shaper on Timken bearings to permit use of effective closures, insure long life.

WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

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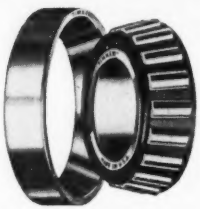

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▱ BEARING TAKES RADIAL ▯ AND THRUST → ▯ ← LOADS OR ANY COMBINATION ✳

Useful New Books & Government Publications

Looking Into Food's Complex Chemical Makeup To Spur Progress In Preparation Technics

THE CHEMISTRY AND TECHNOLOGY OF FOOD AND FOOD PRODUCTS, VOL. II, 2ND EDITION. *Edited by Morris B. Jacobs. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.*, 1951. *935 pages; 6¾ x 10 in.; cloth. Price* $15.

This book concerns the chemistry behind the numerous changes that take place in foods being prepared for consumption.

Thirteen contributors discuss various aspects of the chemical changes that occur in the preparation of dairy products, meat products, fish, poultry and eggs, cereals, edible fats and oils, bakery products, vegetables, fruits, confectionery, coffee and tea, and flavors.

Basic agricultural references are mentioned only where they affect the chemical composition of the foodstuffs reaching the market. Here, U. S. and industry grade standards are introduced in many of the chapters to document the text.

The major part of the volume analyzes the starting, intermediate, and final ingredients going into the above products. Many tables and graphs supplement the work presenting actual field and laboratory data. Numerous references are included.

Where important to the chemical behavior of any food, the effect of outside factors, such as the weather, bacteria, storage and processing methods are introduced. However, since unit operations, quality control, and production technics are covered in the other two volumes of this series (this present work is Part 4 of six-parts being published in three volumes) references to these phases are necessarily brief.

Usually, a short history of the foodstuff being discussed is found in the first part of each chapter. Also overall industry production figures are presented as a means of giving the reader an insight into the growth and magnitude of that particular section of the industry.

In itself, the book may be regarded as a reference to the chemistry of foods. But as part of the series of three volumes, it plays the important role of "go-between"—showing how the chemical building blocks make up and change as a food is brought from source to consumer.

Manufacture of Macaroni

MACARONI PRODUCTS. *By Charles Hummel. Published by Food Trade Press Ltd., 7 Garrick St., W. C. 2, London*, 1951. *223 pages; 5½ x 8½ in., cloth. Price*, $6.20.

Stressing the large-scale methods and machinery required in the making of macaroni, the author also presents other pertinent information of wide interest to this industry. This includes average consumption figures, by country, and a survey of the ingredients used.

Dr. Hummel has obtained an excellent group of pictures illustrating all the steps used commercially in the manufacture of macaroni. These, plus a semi-technical text, make the volume easy reading for anyone associated with the production of this foodstuff.

Sugar Beet Saga

BEET-SUGAR TECHNOLOGY. *Edited by R. A. McGinnis. Published by Reinhold Publishing Corp., 330 West 42nd St., New York, N. Y.*, 1951. *574 pages; 6¼ x 9¼ in., cloth. Price* $10.

Over 30 contributors have cooperated in preparing this story on the sugar beet. Emphasis has been placed on the many chemical engineering aspects in the manufacture of sugar from this source. The following unit operations are described in detail, with accompanying tables, pictures, and graphs: Extraction by diffusion, chemical purification, evaporation, crystallization, and drying.

The agronomy and quality control phases in the manufacture of beet-sugar and its byproducts are also presented in this comprehensive reference.

Advanced Ag Chemistry

AGRICULTURAL CHEMISTRY, VOL. II. *Edited by Donald E. H. Frear. Published by D. Van Nostrand, Inc., 250 Fourth Ave., New York 3, N. Y.*, 1951. *588 pages; 6¾ x 9¾ in.; cloth. Price* $9.50.

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Mound City Ice & Cold Storage Co.
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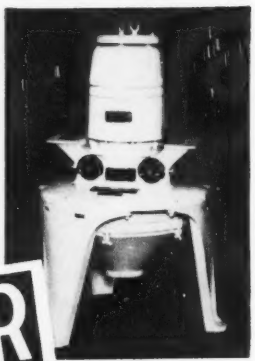

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Foreign Distributors Henry Simon, Ltd., Stockport, England

advanced reference text should be of use to student, processor and researcher alike.

Sections on the chemistry of major agricultural products, fertilizers and soil amendments, nutrition of farm animals, and pesticides make up this volume. Over 20 experts contributed chapters.

Food processors involved in the handling of farm products can here investigate the chemical case history of their raw materials. Frequently industrial details are presented where they tie in with the text.

Government Publications

COMPETITIVE RELATIONSHIPS BETWEEN SUGAR AND CORN SWEETENERS. *U. S. Department of Agriculture Information Bulletin No.* 48. *Price* $1. For the guidance of producing and consuming industries, this report provides information concerning the suitability of the named sweeteners for various prepared food products.

ESTIMATED USE OF WATER IN THE UNITED STATES, 1950. *By Kenneth A. MacKichan. Geological Survey, Circular* 115. Presents a preliminary estimate of the quantity of water withdrawn during 1950 from ground and surface sources.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

EMERGENCY ACTION TO SAVE LIVES. *Federal Civil Defense Administration, Publication PA-5. Price* 5c. Booklet telling how untrained persons may help save lives in an emergency by use of good emergency actions.

WATER SUPPLIES FOR WARTIME FIRE FIGHTING. *Federal Civil Defense Administration, unnumbered document. Price* 10c. Tells where to get water, how to get it, and how to keep it flowing in wartime fire-fighting.

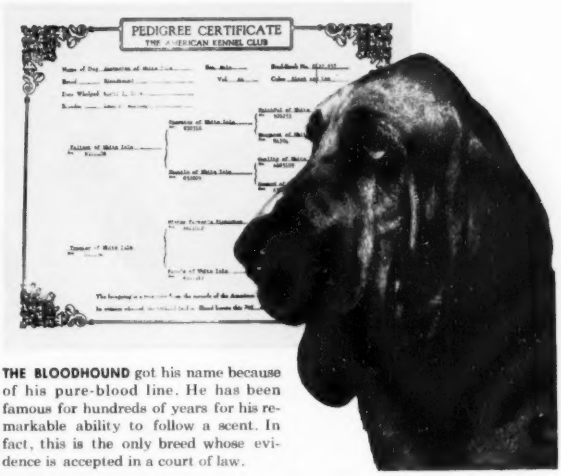
SHELTER FROM ATOMIC ATTACK IN EXISTING BUILDINGS. *Federal Civil Defense Administration, unnumbered Shelter Program document.* This manual is concerned with providing shelter for persons in those areas which, because of their population densities or productive capacities for war essentials, have been designated as critical. (Consult your State Civil Defense organization.)

What's a Pedigree Mean? It Means You Can Be Sure!

...and when you buy Union's *pedigreed* corrugated containers, you can be sure the quality is the same from carload to carload . . . you can be sure your losses from breakage and returns will be at a minimum.

Union corrugated boxes have a pedigree going back in an unbroken line to the forests owned or cultivated by Union . . . to Union's huge mills and fabricating plants. Every step is controlled by Union.

That is why Bayuk Cigars Inc. pack their famous Phillies, the favorite smoke of millions, in Union boxes — the boxes with a pedigree.



THE BLOODHOUND got his name because of his pure-blood line. He has been famous for hundreds of years for his remarkable ability to follow a scent. In fact, this is the only breed whose evidence is accepted in a court of law.

Dependable Packaging Since 1872

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

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Everybody wins

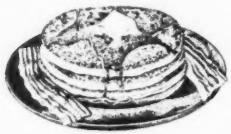
Since everybody likes food, everybody wins when food is at its tasty, nourishing best. For food to be at its best involves many things. Often it involves Monsanto phosphates for leavening and mineralization . . . for emulsifying . . . for cleaning.

Prepared mixes, for example, are leavened with Monsanto sodium acid pyrophosphate and Monsanto HT monocalcium phosphate . . . bread is enriched with Monsanto mineral supplements . . . processed cheese is made smooth by Monsanto phosphates for emulsification . . . sprays for controlling weeds and insects are made more effective by Monsanto wetting agents . . . food processing plants are kept sanitary by cleaning compounds which include Monsanto detergents and phosphates.

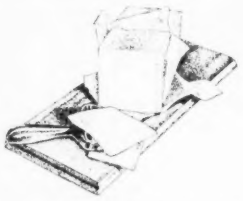
These are only a few of the numerous ways in which Monsanto products help everybody win — with foods that are acknowledged the best and most nourishing in the world. For further information on any of these applications, contact the nearest Monsanto Sales Office or MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES—Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

Better Doughnuts result from the use of Monsanto sodium acid pyrophosphate, MD grade. This leavening was developed especially for machine-made cake doughnuts. It has controlled dough rate of reaction with precision that matches the precision of doughnut-making machines.



Pancakes, Doughnuts, Muffins made of prepared mixes containing Monsanto acid leavening phosphates are wonderfully textured, light, tender, appetizing. Also, they are more uniform throughout, since the last batch of the mix retains the same good qualities as the first.



Processed Cheese is made smooth through the use of Monsanto disodium phosphate as an emulsifier.

• • • •

For Leavening—Sodium Acid Pyrophosphate . . . Sodium Acid Pyrophosphate, Md Grade . . . HT Monocalcium Phosphate.

For Mineralization — Dicalcium Phosphate . . . Tricalcium Phosphate . . . Calcium Pyrophosphate . . . Sodium Ferric Pyrophosphate . . . Ferric Orthophosphate.

Wetting Agents for Compounding Cleaning Mixtures—Santomerse* No. 1 . . . Santomerse 80 . . . Santomerse S . . . Santomerse 30X . . . Santomerse No. 3 . . . Santomerse No. 3 Paste . . . Santomerse D . . . Sterox* SE . . . Sterox SK . . . Sterox No. 5 . . . Sterox No. 6 . . . Sterox CD. *Reg. U. S. Pat. Off.*

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Metal Picture Appears Dimmer Due to Arms Needs, Strikes

The supply outlook in the first quarter of next year for food machinery manufacturers is clouded by military demands and strikes.

The Consumer Durables Division of NPA, which decides how much steel, copper and aluminum the food machinery industry gets, has just been handed a 20 percent cut in copper by the mobilization higher ups.

The Division had hoped to hold the line at about 76 percent of the early '51 level—in the case of food machinery people. But now a number of unforeseen difficulties have popped up to add to demands from our mobilization effort.

In the meantime, fourth quarter allotments are not holding up. If top NPA officials have it figured right, there may be a shortage of around 10 percent in aluminum allotments and 20 percent in copper. That's the price they think industry is going to have to pay for strikes, which cut copper production, and for the northwest drought, which is cutting aluminum.

Copper taken from the stockpile has covered losses from the U. S. strikes. But the Chilean dock strike and declining imports paint a gloomy future. A fourth of U. S. aluminum production is endangered, and we won't be safe from further production cut-backs until spring, when melting snows will supply all the water Columbia river hydro-electric plants can use.

Nickel is being squeezed out of non-defense goods wherever possible, without actually shutting down an industry. This means stainless steel will remain the shortest item for food machinery manufacturers. And until military demands let up, there is no relief in sight for stainless containing nickel.

There's lots of tin in the world. Producers even predict a surplus this year and next. But the supply available to U. S. manufacturers is still under tight control because of the government's reluctance to buy, under its price-cutting campaign. To increase domestic tin supplies depends on the government going back into the world markets and buying from foreign smelters.

Steel supply depends on what you're shopping for. Cold-rolled sheet seems to be in a fairly good shape compared with authorized orders. But orders for hot-rolled sheet and bars still are hard to place with mills.

The steel picture is not smoothing out as NPA officials had hoped it would be during the fourth quarter. It looks now as if there will be trouble placing authorized orders during the first quarter.

On Bread Agents

Atlas Powder is recommending that NRC specifically omit references to surface-active agents in bread in the main body of any final standards order that might be forthcoming.

Instead, it suggests the attachment of a supplementary paragraph temporarily allowing mono- and diglycerides, plus other agents, to be added to a level of no more than 12½ percent of the shortening contained in the bread.

This would allow all the manufacturers conducting experiments enough time to correlate their results for presentation before the public hearings —which would be held two years from the effective date of the final standards.

Keep 'Em Rolling

The U. S. Chamber of Commerce in its new pamphlet entitled, *Stretching the Freight Car Supply*, outlines measures for meeting our current freight car shortage.

Shippers are asked to—Load cars fully; load, bill and unload promptly; load and unload six days a week; clean cars before releasing; and try to load cars towards owner's lines.

Carriers should—Spot and pull cars promptly; speed up terminal and line-haul operations; distribute car supply efficiently; avoid accumulation of cars; repair bad-order cars promptly; and give maximum six-day service.

Teflon-Coated Bread Pans

A new method of eliminating the tedious, costly job of greasing bread pans is in the experimental stage, according to Einer L. Anderson, First National Stores, Inc., Somerville, Mass. This information was presented in a talk before the New York Metropolitan Bakery Production Club.

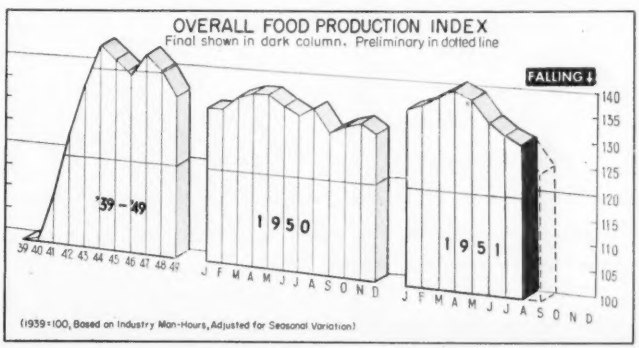
The technic consists of spraying a .001-in. film of Teflon on the inside of the pans, followed by baking the plastic on at 700 deg. F. Bread pans so treated have been used 220 times, without the need of regreasing or recoating the pans with the plastic.

Flattens Hauling Costs

Collapsible wire box-type containers are being successfully adapted to the shipment of green meats between plants.

Designed with a pallet or skid-type bottom and sides of # 2 gage galvanized wire mesh, these boxes may be quickly flattened. Then substantial savings in space can be made for the return haul.

Borrowing the idea from the heavy machine industries, meat people are, in measure, returning the compliment paid them years ago when their dressing and cutting lines were emulated.



SCRUBBING CORROSIVE GASES ?

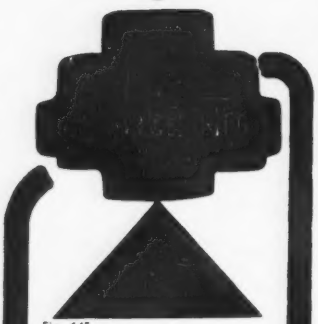


Fig. 645

Are your scrubbing nozzles as efficient as you think they could be? Do they resist the corrosion or wear conditions satisfactorily — produce the breakup and distribution you would like?

Outline your spray problem for use—if your liquid can be sprayed with direct pressure at all—Monarch can furnish the nozzles.

NOZZLES FOR:

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- HUMIDIFYING
- AIR WASHING
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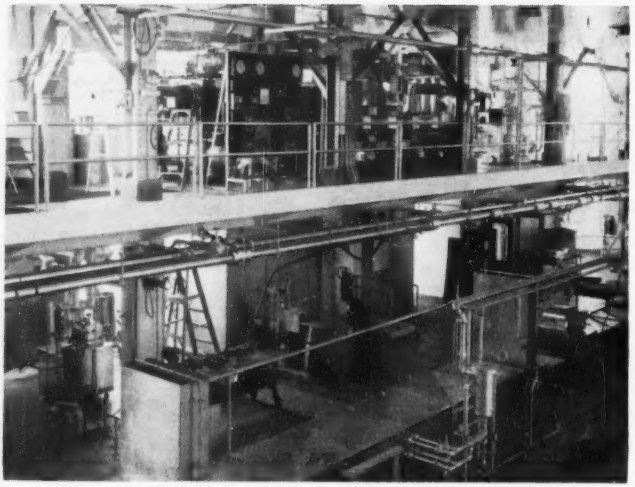


New Food Lab at WRRL

Greatly enlarged and modernized laboratory and pilot-plant facilities have just been made available for food research at the Western Regional Lab of the USDA at Albany, Calif. A two-story, 97x60 ft. area has been fully equipped for studies in concentration, dehydration, freezing, and canning. Of more than passing interest is the work being done on "dehydrofreezing" (partial dehydration followed by freezing) and "dehydrocanning." Also noteworthy are the new cold rooms built below the lab. Of the ten units planned, four are already completed. In them, temperatures may be controlled from —30 deg. F. to 40 deg. F.

Up Grease Savings

Several modern meat plants now are effecting exceptionally efficient degreasing of the residue from their steam rendering operations through the use of centrifuges.

In these plants, a slurry of disintegrated solids-in-tank water is fed to the centrifuges, with a solid grease residue being discharged. The resultant net tankage usually contains a much lower grease content than residue which has been handled in the conventional hydraulic presses.

This method is cutting costs by eliminating the expense of press cloths, lowering labor requirements, and reducing grease losses.

Rapid Meat Thaw

A safe, uniform and fast procedure for defrosting frozen green bellies has been experimentally developed by the American Meat Institute Foundation.

Utilizing high-frequency dielectric heating with special electrode plates, this new method brings the temperature of the meat up to, but no higher than, 40 deg. F. in less than 60 sec. Frequencies of 6 to 7 million cycles are being employed.

In the experimental runs, a 15 kw. oscillator was used at a total cost of $500 per kw. of capacity. Power consumption was 1 kw. for every 50 lb. of meat thawed per hour. Preliminary estimates indicate that the defrosting cost using this new method would run about 10c. per 100 lb.

The Foundation became vitally interested in the problem because present commercial defrosting technics are time-consuming, require large amounts of space, and offer an excellent opportunity for bacterial or enzymatic action. This new high-frequency procedure is expected to be tried under plant conditions shortly.

In the Bag

The handling and freezer storage of fresh meat trimmings are being streamlined through the use of multi-wall paper-plastic bags at Oscar Mayer & Co., Madison, Wis. By eliminating the standard slack barrel for shipment and the conventional fiber box in storage, new economies are expected.

Basic advantages in using the kraft paper bag, coated on the inside with polyethylene, include: (1) Lower container costs, (2) less freezer burn, (3) better sanitary conditions due to the disposable nature of the bag, and (4) less storage area requirements.

Best results with the bags have been obtained while using a newly developed

bag-filling machine and tight temperature control. Developed at Mayer's, the filling machine employs a force feed auger and automatic weighing device in packing the trimmings, while being held in the 30 deg. F. range.

Field Facts

Reports from growers and processors, during the month, present this picture—

Truck crops, overall, will be one-fourth larger than last year, with current inventories of *frozen foods* the largest ever. But total supplies of *canned vegetables* are much lower than last year . . . Eastern *tomato* canners are filling in with *green beans*—due to an extreme shortage . . . *Kraut* packers are enjoying a boom, with seasonal production pushing ten million cases . . . *Snap and lima bean* prospects look good, with higher '51 harvests than in '50. However the *beet* crop is off 8 percent . . . Canned *apricot* stocks have been replenished with a good California pack . . . Pushing 200 million pounds, the pack of *frozen green peas* is at an all-time high.

Demand for *frozen fish fillets* remains high . . . In California, increasing Japanese and Peruvian *tuna* imports are forcing idle many boats . . . And *Northeastern fishermen* are having their difficulties—with rising costs of production and declining supplies.

The eight-month production of *oleo* for '51 has already surpassed that of any previous whole year . . . *Frozen eggs* are falling off, riding with a decline in demand . . . Part of the increase in Wisconsin *butter* output (not a general condition) can be attributed to greater activity in the U. S. *cheese* industry.

Lard production may outrun demand this winter, especially due to 70 percent more *cottonseed* than in '50 . . . The national *potato* output is expected to be 20 percent less than last . . . Lower hop prices should result from the bumper harvest in Germany . . . Poultry going into cans this year is at an all time high, production up 26 percent over '50.

Hog raising, which has been steadily expanding for the past five years, is still on the upswing . . . The country's *sheep* population is now climbing after being 40 percent below normal . . . Per capita consumption of *meat* in 1952 is estimated at 146 lb.

Container Outlook

Substitution, standardization, and container re-use are the factors keeping the packaging materials supply and demand picture in balance.

However, with increased military

POWDERS

FREE FLOWING SOLIDS

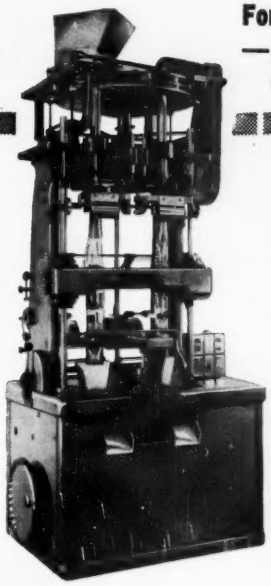
TABLETS

LIQUIDS OR SEMI-LIQUIDS

TRANSWRAP

HERE'S HOW TRANSWRAP HELPS YOU BEAT YOUR PACKAGING PROBLEMS TODAY!

For everyday civilian sales —and for government contract packaging



Transwrap's fully automatic, high-speed packaging of your product is the answer to your 3 big critical shortages . . .

MANPOWER Transwraps are fully automatic. One unit exceeds the output of 15 to 18 hand workers; and 2 operators can handle 10 Transwraps. This means you can increase your production per man-hour as much as 90 times!

TIME One Transwrap can automatically *form, fill, seal and deliver* 216,000 packages in an around-the-clock, 24-hr performance! This high-speed dependability is why more Transwraps were used in WW2 govt packaging—and are again, in today's emergency.

MATERIAL Save on both bag and product wastage. Transwraps use economical roll materials; eliminate wasteful puckering, distortion and gumming of bags; insure extra-fine precision measuring; minimize expensive breakage of fragile products.

Need Help?

Transwrap's engineering staff will be glad to assist you in analyzing your packaging requirements . . . make specific recommendations designed to improve your production—at lower costs.

All this adds up to CUTTING DOWN YOUR PACKAGING COSTS! Tremendous savings on labor—and stretching out critical manpower! Eliminate high cost of ready-made bags! Reduce material wastage—and breakage! Cut maintenance costs! *PLUS* complete assurance of avoiding costly contract overtime penalties!

Remember, too—Transwrap actually gives you a *better* package . . . smarter-looking, faster-selling. A package that *seals in* the fresh flavor and quality of your product—and *seals out* damaging air, vapors and moisture. You can't afford *not* to investigate Transwrap for your packaging economy. Do it today—*now!*

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requirements and current depletion of product inventories, the situation is expected to become tight.

A rundown on the packaging picture shows that—

Glass container production is at an almost record high—a rise of 14 percent over last year, "non return" beer bottles being the leader. Raw materials appear adequate, except for selenium.

Textile bags—both burlap and cotton—are in good supply.

Wooden box and crate supply looks a little better with increasing lumber stocks. Wire, nails, rivets and other metal items remain short, but generally sufficient for current operation.

Can supplies are still critical—especially with increasing food production. Voluntary allocations are being resorted to by manufacturers.

Plastics are also on the critical list. Polyethylene and cellophane being especially in demand for DO's. Pliofilms have eased, though.

Paper products in general are almost adequate, but kraft, cups, and milk containers are short. This situation holds in spite of record production in all sections of the industry.

Sugar Aids Defense

Dextran—a polysaccharide produced only from sugar—is now becoming a vital blood plasma substitute.

Though not able to supply oxygen to living tissue, dextran has about the same viscosity, osmotic effect, and molecular weight as human plasma, and therefore can be used to aid in restoring volume of circulating blood.

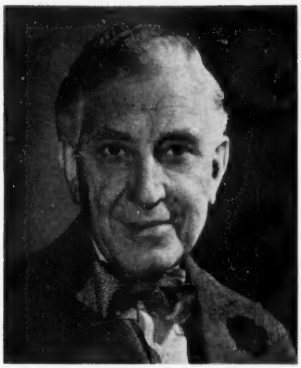
Research is being conducted in over a dozen centers in the U. S. to determine its effect on the metabolism of the human body.

Derived from glucose, its cost is only about one-fifth that of plasma. It can be stored without refrigeration for an indefinite period of time, and the solution can be easily sterilized and kept free of the viruses sometimes transmitted by plasma. In addition, dextran does not interfere with blood typing for subsequent whole-blood transfusions.

Cans Citrus Year 'Round

Fulfilling a long-held citrus-canner's aim, Bruce's Juices of Tampa, has just completed twelve continuous months of fresh-fruit operation—the first time a Florida canner has successfully eliminated the usual summer shutdown.

This was partly due to the late Valencia crop and early grapefruit in the '51-'52 season, and partly to increasing amounts of "summer oranges" being grown.



JOHN A. HARTFORD

A&P Chief Dies

John Augustine Hartford, passed away on Sept. 20, at the age of 79.

Considered the architect of America's system of mass distribution, Mr. Hartford was president of the Great Atlantic & Pacific Tea Co. since 1920. He and his brother, George, the company's surviving trustee, built the A&P chain into today's three billion dollar business having 4,500 retail outlets.

A&P was founded by George Hartford, John's father, who died in 1917. John, however, was responsible for most of the merchandising innovations which have made the company a leader in its field. He was active to the last minute prior to his death.

Hold Can-Base Periods

The NPA has just emphasized under its M-25 tin can control order, that canners will still be permitted to choose the most favorable base period for each product canned. These figures will be used to determine the number of cans authorized to any canner.

A statement was made to clarify an apparent misunderstanding arising from a recent amendment to the M-25 order.

The years 1949 and 1950 can still be considered for establishing base periods for each individual item under the amendment.

Food Stocks Dip

We're losing ground in the battle for all-out agricultural production, according to the USDA. This situation exists in spite of prospects for a near-record harvest in 1951.

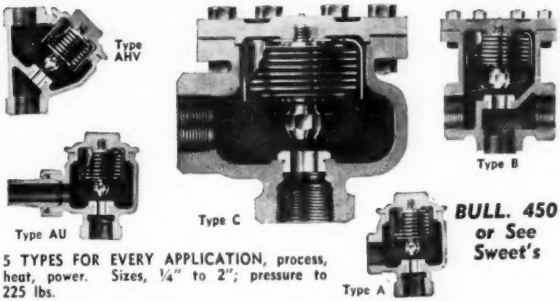
Since Korea, our food stocks have all dwindled—some to alarmingly low levels. Butter and dried milk are about one-fourth of pre-Korea levels, while canned vegetables and fruits are

In This Plant Nicholson Traps

SAVED 10% IN STEAM COSTS

Chief Engineer H. F. D. stated, after Nicholsons replaced mechanical traps in his plant: "Saving in steam waste cut our fuel cost at least 10%. Yet application temperatures were up 30°-40°. And relief of all air binding effected faster warm-up."

Operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting. For other advanced Nicholson features send for Bulletin 450.



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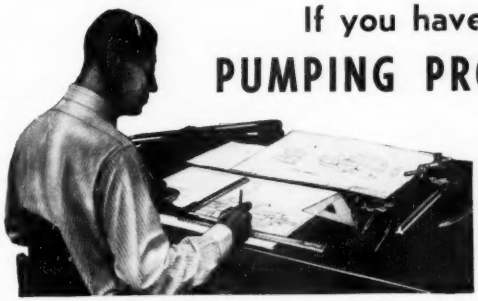

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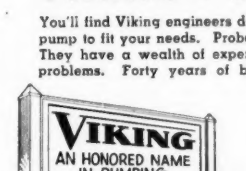

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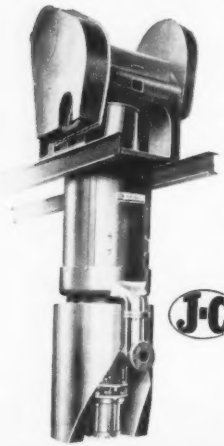

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VISCOSE: Optimum press ratios in continuously pressing alkali from cellulose.
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POTATO STARCH PLANTS: Dewatering pomace.
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GLUE PLANTS: Maximum grease recovery and drier pulp.

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for fast, safe handling of drums and barrels

One man, with the COLSON universal drum truck, easily does the work of two. It locks any size container between the adjustable chimb hook and pick-up tips, lifts it easily and carries it with the weight evenly balanced over the wheels.

Other work-saving Colson materials-handling equipment includes hand trucks, platform trucks, Lift-Jack systems and wheels and casters to meet every industrial application. Write us or consult your phone book for the Colson office near you.

Write *Today for Free 56 page catalog.*

THE COLSON CORPORATION
ELYRIA, OHIO
CASTERS . . . LIFT-JACK SYSTEMS . . . INDUSTRIAL TRUCKS

down 10 to 15 percent. And further depletions in stocks of processed foods are anticipated.

The contributing factors in this losing battle include:

1. A 13 percent rise per capita in food consumption above the 1935-39 average.
2. Volume of agricultural exports up 50 percent over 1939.
3. Increasing population—at a rate of 2 million a year.
4. Partial military mobilization.

To stem the tide, says USDA, industry and agriculture will have to work together in producing the necessary food and the tools to grow and harvest the crops. Only through the highest operating efficiencies in an all-out effort will we be able to maintain our living standards.

Concentrate Bottleneck

Frozen fruit juice concentrators are sharply viewing recent pasteurization and aseptic canning developments. Mounting stocks of concentrates are frequently bottlenecked in inadequate retail freezer cabinets affording little, if any, display space.

Under critical investigation are the Martin aseptic canning process, in-can pasteurization, and electronic radiation among others. The goal is a product which can be kept without freezing, retaining all the natural flavor of the original juice.

Can Keep Salmon Frozen

The Fish & Wildlife laboratories have come up with a series of practical suggestions on how best to freeze, transport, and store fresh salmon for canning.

The practice of freezing salmon for later canning has recently been encouraged to provide areas having short runs with enough fish. Also there is an availability of tuna boats,

"I GUESS IT'S DONE. IT FORMS A HARD BALL IN COLD WATER."

equipped for freezing at sea, which are being diverted to the transporting of frozen salmon.

Bacterial spoilage, due to slow-freezing, can be prevented by taking care not to overload the refrigeration systems. Storage temperatures close to or below 0 deg. F. and provision for a good ice glaze are the best ways to eliminate oxidation of the oils and pigments of the flesh—thus eliminating the danger of rancidity.

In freezing a certain amount of denaturation of the protein occurs which causes an excessive amount of curd formation in the canned product. Also, due to this, the salmon put up from frozen stocks, may tend to be tough, dry, and discolored. Limiting the storage time to no more than two or three months will help keep the denaturation under control.

Opens Western Lab

A modern research laboratory, built for the Western Branch of the National Canners Assn., was scheduled to be opened at Berkeley, Calif., with a formal ceremony on Oct. 12.

Built at a cost of half a million dollars, the two-story structure contains 19,500 sq. ft. of working area. Its work will be devoted to the improvement of food processes, development of food standards, and furtherance of efficient methods of plant sanitation.

The new lab will contain bacteriological, chemical, microanalytical, nutrition, sanitation and engineering units.

W. K. Kellogg

Will Keith Kellogg, pioneering force behind the nation's breakfast-table revolution, died in Battle Creek, Mich., on October 6, at the age of 91.

Founder of the company bearing his name, he was largely responsible for the vast "cold" cereal industry in this country as well as the philanthropic Kellogg Foundation.

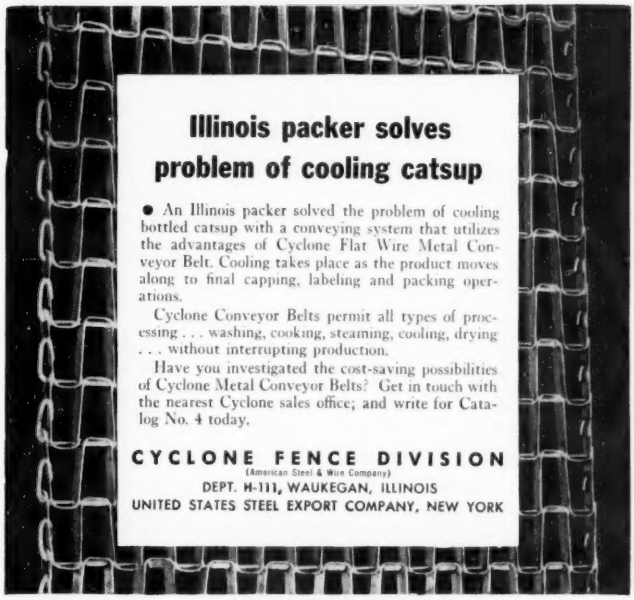
From 1896, when he introduced a wheat flake, to 1946, when he retired as chairman of the board, he was constantly active in the food field.

Coop Pulls Coup

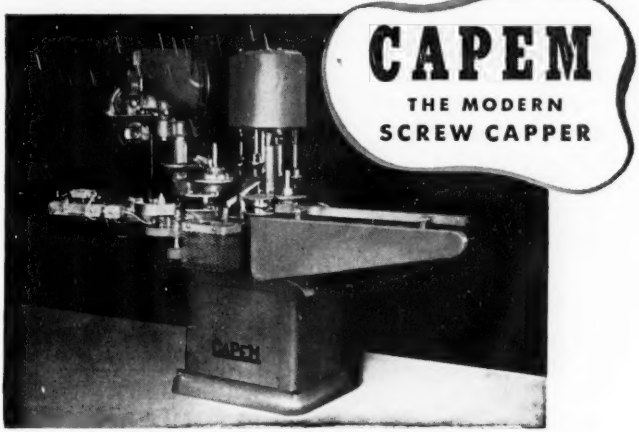
Sale of Snow-Crop's citrus processing plants in Florida to the Florida Citrus Exchange appears to be completed—except for the signing.

This deal, which will transfer 25 percent of the state's concentrating facilities over to a group of growers controlling 25 percent of the Florida crop, will have many far-reaching consequences in the industry.

The Exchange will be able to pro-


Illinois packer solves
problem of cooling catsup
● An Illinois packer solved the problem of cooling bottled catsup with a conveying system that utilizes the advantages of Cyclone Flat Wire Metal Conveyor Belt. Cooling takes place as the product moves along to final capping, labeling and packing operations.
Cyclone Conveyor Belts permit all types of processing . . . washing, cooking, steaming, cooling, drying . . . without interrupting production.
Have you investigated the cost-saving possibilities of Cyclone Metal Conveyor Belts? Get in touch with the nearest Cyclone sales office; and write for Catalog No. 4 today.
CYCLONE FENCE DIVISION
(American Steel & Wire Company)
DEPT. H-111, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS CYCLONE METAL CONVEYOR BELTS
UNITED STATES STEEL

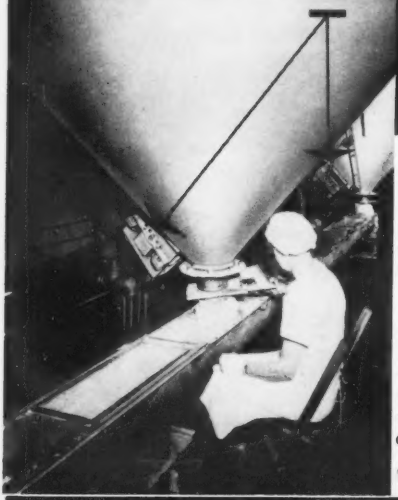


- Applies any type of standard screw cap or cover at speeds of 2,000 to 10,000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

SYNTRON
"Pulsating Magnet"
ELECTRIC VIBRATORS



Assure FREE-FLOWING BINS, HOPPERS AND CHUTES

Model V-75 Vibrators prevent the clogging of milk powder at a critical point in these Evaporators — — where powder moves into the conveyor.

Their 3600 vibrations per minute assure a smooth, effortless, flow of material — — and they can be applied to most any size and shape of bin, hopper and chute.

Write for catalog information

SYNTRON COMPANY
460 Lexington Avenue Homer City, Penna.

CP Refrigerating Equipment at this Food Processing Plant includes two 5 x 5 Compressors, three 6½ x 6½ Compressors and one 6¾ x 5 Type "K" Booster.

*Food Processing Plant** Depends on CP for *Automatic* REFRIGERATION 'ROUND THE CLOCK

Here you see an operation of five CP Vertical Compressors of various sizes and a Type "K" Booster doing their jobs with a minimum of manual supervision. They cut in and out automatically, or at the flip of a remote switch, to provide exactly the right refrigeration for processes and equipment throughout the plant.

So dependable they rarely require attention—so efficient they cut refrigeration costs to rock bottom—they are typical of what happens when CP engineering plans refrigeration systems and equipment for *any* refrigeration need . . . *including yours.* When you call in the CP Representative you put over 60 years of refrigeration experience to work for you. Why not call in CP the next time you have a refrigeration problem?

Whether you need 1 ton or 100 tons of refrigeration capacity, let CP work with you. In the complete CP "Balanced Line" of compressors you will find exactly the unit or combination of units best suited to your requirements.

THE *Creamery Package* MFG. COMPANY
General and Export Offices: 1243 W. Washington Blvd., Chicago 7, Illinois. *Branches in 21 Principal Cities*
*Name upon request

vide its member growers with a stable market through the exclusive use of the Snow Crop label for Florida juice, as well as enjoying many processing tax advantages. Also the 7,500 acres of citrus groves owned by the Snow Crop Div. of Clinton Foods will be brought into the Exchange's ranks (though not sold).

Snow Crop in turn will become marketing agent for the Exchange—without the headaches of production, costs of carrying hugh inventories, and trials in keeping abreast of the fr. it market. They will, incidentally, receive something on the order of $12.5 million as part of the deal.

Chem Show to Be Biggest

With emphasis on the fact that *all* technical and scientific people, as well as executives, economists, production men and bankers, are qualified for admittance, preparations are being rounded out for the 23rd Exposition of Chemical Industries, slated at Grand Central Palace, New York City, from Nov. 26 through Dec. 1.

Over 400 companies will offer displays at this biggest show. Process equipment, raw and finished chemicals, and laboratory apparatus will be exhibited. Every phase of the chemical industries will be covered—right up to the fully developed industrial unit.

Mexico Spurs Sugar Cane

The Mexican Government has approved a plan whereby some $20,000,000 will be invested during the present year for the purpose of boosting Mexican cane sugar production to an annual tonnage of 700,000 tons.

The funds will be invested as follows: 11 million, improvement and construction of sugar refining mills; 4 million, seeding of 75,000 additional acres of sugar cane plantations; 1.4 million, acquisition of agricultural machinery; and 3.6 million, new irrigation projects for cane land.

Gage of Good Meat

"Lean meat without too much fat, tender and juicy meat, full of flavor, and lots of it at the lowest possible cost." This is the American consumer's criterion of good meat, according to Dr. F. E. Deatherage, Ohio State University professor.

Contributing to a symposium on meat chemistry at the recent American Chemical Society conclave in New York City, Dr. Deatherage continued: "By conducting meat research and carrying on livestock production programs from

the consumer's point of view as well as the producer's, progress can be made."

Note was particularly made of the various factors in the meat itself that contribute to its tenderness. Both connective tissues in meat and muscle plasmas have an effect.

Meat is thought to be composed of groups of long, slender, thin-walled cells containing a gelatin-like protein fluid. This fluid, the muscle plasma, accounts for about 90 percent of the muscle substance. The connective tissue fibers bind the cells into bundles.

When meat is cooked, the proteins in the muscle plasma coagulate and harden. Usually, the higher the temperature at which meat is cooked, the greater the degree of coagulation. However, if it is cooked sufficiently to convert some of the connective tissues to gelatin, a tenderizing effect is noted.

(*Turn page*)

Hors d'Oeuvres

• General Mills has just introduced a timely pastry—with character. Made from a prepared cake mix and packaged fruit gelatin, its called Colorvision Cake and has teletaste appeal.

• *We've finally successfully canned pure drinking water—using a wax-lined container and specially tested alkaline aqua. Seems like a wasted achievement, what with canned beer available.*

• Now radioactive advertising! General Foods plans to launch an advertising campaign based on a Geiger count indicating quick digestibility of one of its breakfast foods. Fine, but no atomic oats, please.

• *Bigger and gamier fish in the Shenandoah are being attributed directly to a plant at Elkton, Va., which has been dumping waste water containing vitamin B_{12} into the river. Really aptly named the "growth vitamin".*

• Hope for treatment of mental diseases through the diet appears to be a promising possibility, according to Dr. R. J. Williams of the U. of Texas. With prices what they are, a lot of people are crazy for a good steak.

• *Know why the Pilgrims changed their original plans to drop anchor off Virginia and stopped at New England instead? Because their beer supply had vanished —and not overboard either.*

• Under terms of a recent will, a farmer in Anderson, Mo., stands to inherit a $14,000 farm if he can safely hang onto a 59 year old bottle of strawberry pop. It'll surely take lots of willpower.

• *There's an alarming shortage of a very vital commodity in the U. S. at this time. It's blood plasma. You, and only YOU, can relieve the tight condition . . . so contact your Red Cross today.*

Imprinting Flavors and Code-Dates on Ice Cream Containers
Another SUCCESSFUL APPLICATION of the ROLACODER* Marking Machine

Models for Every Size from 1-pint Carton to 5-gallon Drum

ADOLPH Gottscho INC.
MACHINES to MARK whatever you make

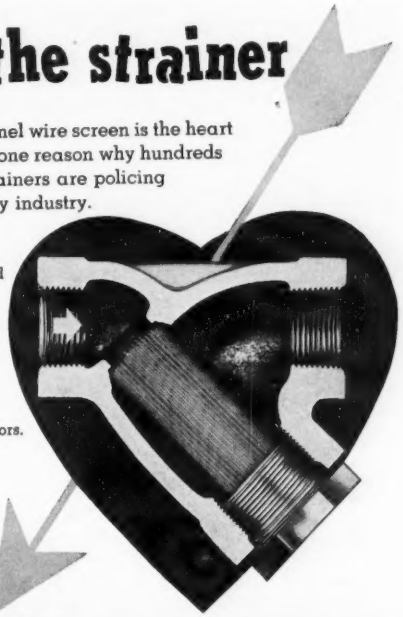
Most economical way to imprint flavors, code-dates, other variable information on ice cream packages is to use a Gottscho ROLACODER. The friction-actuated ROLACODER works automatically as part of your existing packaging or conveying operation—eliminates costly hand-stamping or stencilling. Delivers clean, sharp, permanent imprints *consistently*. A compact, inexpensive and precision-engineered machine, the ROLACODER uses interchangeable rubber type or dies, inks of various colors. Models to imprint small or large legends on top or side of all kinds of packages.

• *Request new descriptive brochure "ROL"*

ADOLPH GOTTSCHO, INC., TERMINAL ROAD, HILLSIDE 5, N. J.

heart of the strainer

A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.



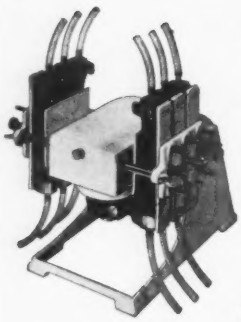
OTHER REASONS—

- cadmium plated bodies and screen caps
- straight threads, machined faces and spark-plug-type gaskets on screen caps
- ten sizes from ¼" to 3"

Sold by 216 industrial distributors. Write for Bulletin S-203.

YARNALL-WARING CO.
127 Mermaid Ave.
Philadelphia 18, Pa.

YARWAY STRAINERS



News for Chemists

BROSITES
PROPORTIONING PUMP
MODEL No. 0, "6 in 1" PUMP

DESIGNED FOR LABORATORY AND PILOT PLANT WORK IN THE FIELD OF CHEMICALS—FOOD AND DRUGS

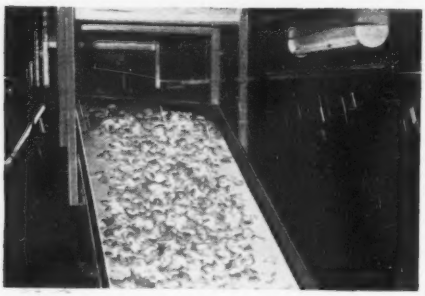
All Parts Coming in Direct Contact With the Liquids Can Be Sterilized

THE MODEL No. 0, "6 in 1" PUMP IS A UNIT COMBINATION OF SIX SEPARATE PUMPS OPERATED BY A COMMON MOTOR OF FRACTIONAL H. P.

Each separate pump has a capacity of from 1 cc to 500 cc's per minute when the solution is water or a free flowing liquid. A total capacity of 3000 cc's per minute can be obtained with all six pumps hooked up to a common source of supply and a common outlet. A regulated flow of from 1 cc to 500 cc's per minute can be obtained from a single pump and a specific output of one and up to six separate liquids can be delivered simultaneously in desired proportion within the capacity of the unit.

FOR FURTHER INFORMATION WRITE

BROSITES MACHINE COMPANY INC.
50 CHURCH STREET (Cable Address—BROMACH) NEW YORK 7, N. Y.
TELEPHONE DIGBY 9-3600



SUPRENE BELTING...

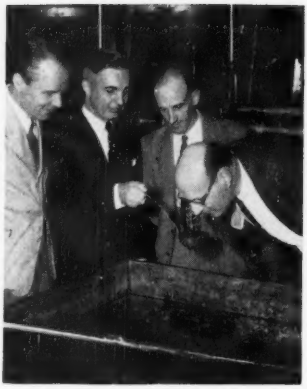
Likes Having Its Face Washed!

Wherever cleanliness is a factor . . . in cleaning fruits and vegetables, in the manufacture of biscuits, crackers, bread, candy and cheese *. . . sanitary, Suprene Belting is always in demand!* That's because it's so easy to keep clean! . . . washes like new with steam or hot water.

A superior cotton duck belt, Neoprene impregnated, it is highly resistant to the corrosive action of fats, greases and fruit acids. Odorless, tasteless and waterproof, Suprene Belting offers years of safe and sanitary conveyance. Available in a variety of plies and four styles to meet all your food handling requirements. Send for Bulletin 20.

6639

Victor
Balata & Textile Belting Co.
53 Park Pl., N.Y. 7 • 200-6 W. Hubbard St., Chicago 10
Factory: Easton, Pa.



British Check Preserves

Members of the British Productivity Team, who recently completed a tour of U. S. food processing plants, inspect strawberry preserves. This was one of the operations checked at the A&P Quaker Maid plant in New York. Left to right—H. W. Caldwell, E. J. Beach (Quaker Maid plant manager, T. A. Evans, and John Bach (tour manager for the Economic Cooperation Administration).

New FE Promotion Head

Richard H. La Bonte has been appointed promotion and market research manager of FOOD ENGINEERING, succeeding Harold B. Wells, resigned.

Mr. La Bonte was editor of *Food Packer* since 1949, and previous to that, did advertising and sales proprotion work at the Curtiss Candy Company.

During the war, Mr. La Bonte served as commanding officer of a sub-chaser. He attended Colgate University.

New Courses, Studies

Improved food courses and financial grants have broadened educational facilities at a number of colleges throughout the country.

A new four-year course in food technology is being offered at the University of Miami this fall. The curriculum, which includes plant management, product development, research, and government inspection, fulfils requirements and recommendations of the National Institute of Food Technology. Kansas State College has also enlarged its curriculum.

Some of Kansas State's new courses include flour and feed mill construction, elements of feed manufacture, and feed technology. These changes were instituted as result of a $200,000 grant from the feed milling industry.

The *TASTE* difference

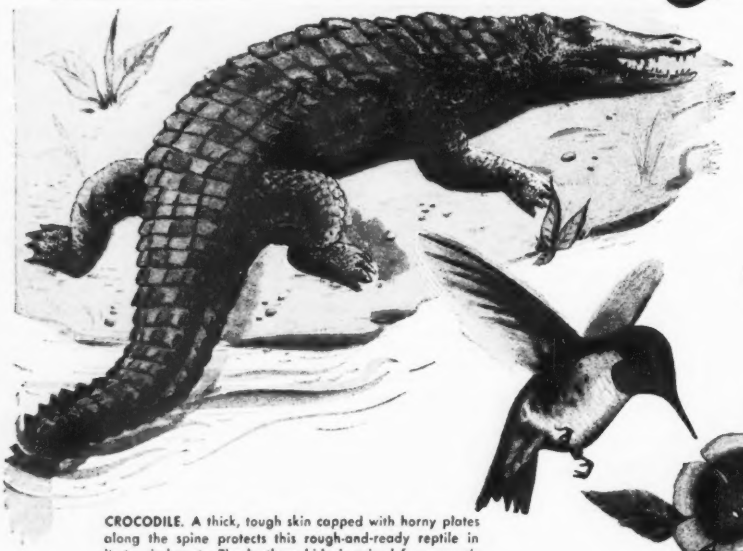
makes the *SALES* Difference

STANGE CREAM OF SPICE *SEASONINGS*

"SILENT PARTNERS I[illegible] FA[illegible]US FO[illegible]DS"

Before you "Season"— Consult:
WM. J. STANGE CO.,
CHICAGO 12, ILLINOIS . . .
OAKLAND 6, CALIFORNIA

PROTECTION AND *Beauty*



RUBY-THROATED HUMMING BIRD. Quick!—with wings that move 40-50 times per second. And beautiful!—metallic green back feathers and a scarlet bib.

CROCODILE. A thick, tough skin capped with horny plates along the spine protects this rough-and-ready reptile in its tropic haunts. The leathery hide is prized for women's shoes, handbags, and luggage.

KVP *Papers* for the **FOOD INDUSTRY**

It takes so little of the right thing to make sure your foodstuffs are clean, fresh, tasty, and wholesome, when they reach consumers. Yet it means so much to sales!

KVP Papers are the "right thing" . . . in more ways than one. Right for protection. Right for price. Right for extra sales appeal that may be added through colorful designs created and produced by KVP artists and printers.

INDUSTRIES SERVED

BAKING
Bread — Cracker
Cereal

MEAT
Packing — Locker
Retail

DAIRY
Butter — Cream — Cheese
Ice Cream — Milk

FISH • FRUIT • FROZEN FOODS
POULTRY • SHORTENING • VEGETABLE

Kalamazoo Vegetable Parchment Company

PARCHMENT • MICHIGAN

ASSOCIATED COMPANIES:
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IN CANADA:
THE KVP COMPANY LIMITED, ESPANOLA, ONTARIO
APPLEFORD PAPER PRODUCTS LIMITED,
HAMILTON, ONTARIO • MONTREAL, QUEBEC

Twenty-four other institutes of higher learning will receive from Swift & Co. over $160,000 for scientific research in agriculture and human nutrition.

At the Drexel Institute of Technology in Philadelphia, a course in food process control is being launched, while the 21st annual State College of Washington Institute of Dairying is now being planned for Mar. 10-14.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early October is reviewed below:

Future Hearings

1. *Canned pineapple and canned pineapple juice,* new, standards of identity, quality, and fill of container. Hearing scheduled to begin Oct. 30, with B. D. Levinson as presiding officer.

2. *Salad dressing,* rehearing, standard of identity; "cream, milk, and milk products" proposed as optional ingredients. F&DA still gathering data; no date set yet.

3. *Process cheese food,* amendment, standard of identity; skim milk cheese proposed as optional ingredient. No date set yet.

4. *Canned tuna,* Hearing rumored but no date set yet; initiative of Administrator.

5. *Frozen vegetables,* hearing is rumored but no date set yet; initiative of Administrator.

Hearing in Progress

Ice cream, new, standard of identity. Marking time until Nov. 5, at which time testimony on harmlessness of surface active agents was scheduled to begin. Following the direct testimony, a two-week recess has been scheduled before cross-examining the witnesses. The hearing will then conclude with any miscellaneous testimony pertinent to ice cream.

Tentative Orders Awaited

1. *Residue tolerances,* on fresh fruits and vegetables, new. Expected in late fall or winter; hearing adjourned in Sept. 1950; briefs were filed in Dec.

2. *Margarine,* amendments, standard of identity. Expected soon; hearing adjourned in April; briefs were filed in May.

Final Orders Awaited

1. *Bread,* new, standard of identity. Expected soon; tentative order published Aug. 1950; exceptions filed in Nov.

2. *Frozen fruits,* new, standards of identity and fill. Expected soon; ten-

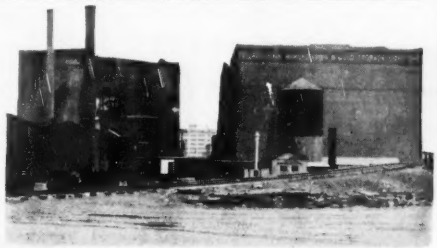
Whatever your process—canning, freezing, dehydrating or other operations—rugged, long-lasting LaPorte Belting *out-performs* all other types of belting. It quickly and safely carries your product through every processing job . . . from loading hopper to shipping room.

LaPorte flexibility insures tighter grip of belt on friction drum . . . can't creep, weave or jump. Provides perfectly flat surface for containers, empty or filled. Highly resistant to heat and cold. *Open mesh construction* permits faster, easier cleaning . . . makes possible the circulation of air, heat, cold or moisture around products in process. Choose LaPorte for extra trouble-free service.

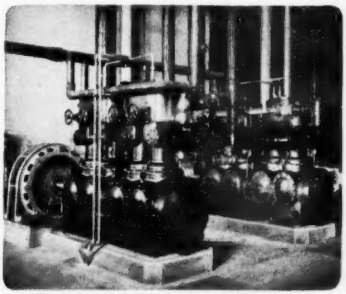
Write at once for literature and prices—no obligation

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

BIG COLD STORAGE MODERNIZES with FRICK Refrigeration



The three buildings of the Philadelphia Warehousing and C. S. Co. occupy a city block along the Delaware River water-front. Until recently the cold storages were cooled with steam-driven refrigerating machines installed in 1890 and 1911.



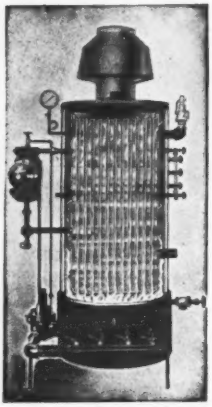
Two of the Four Frick Ammonia Compressors at the Philadelphia Warehousing and C. S. Co.

Today the cooling load is carried by four new Frick compressors, driven by electric motors totaling 775 hp. A battery of large shell-and-tube brine coolers was included in the modernization program.

Let us submit estimates on the up-to-date cooling equipment you may need: write, wire, phone or visit

FRICK & CO. WAYNESBORO, PENNA. U.S.A.
Also Builders of Power Farming and Sawmill Machinery

COMPLETELY *AUTOMATIC*



The KANE Boiler, built to A.S.M.E. specifications, in sizes to 30 H.P.

REQUIRES NO ATTENDANT... ONLY A BARE MINIMUM OF FLOOR SPACE

the KANE BOILER PACKAGE

Here's a truly *"unitized"* steam supply—a compact, self-contained BOILER PACKAGE that is completely automatic . . . requires no attendant and only a bare minimum of floor space. The KANE BOILER PACKAGE includes: the correctly sized Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

ENGINEERED STEAM AT ITS BEST

MEARS-KANE-OFELDT INC.

P. O. BOX 223 BRIDGEPORT, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

Your Guide to

PROFITABLE DRYING

describes the more than 30 types of **STANDARD-HERSEY DRYERS** for every Process Industry need.

Send FOR YOUR COPY TODAY!

Examples of how Standard-Hersey Dryers make money for their operators. Special features and advantages of Standard-Hersey Dryers, Kilns, Coolers and Calciners. How our "pilot" dryer takes guesswork out of dehydrating problems. Write for Dryer Bulletin 508.

STANDARD HERSEY *Dryers*

STANDARD STEEL CORPORATION
5045 Boyle Ave., Los Angeles 58
123-45 Newbury St., Boston 16

metal *brightness*

Food plants choose Metso for its effective removal of grease, oil and soil with a *safety margin*. Metso's special property increases cleaning action and also curbs corrosion of metals.

Save your equipment. Keep it bright and clean with Metso.

Philadelphia Quartz Company
1148 Public Ledger Bldg., Phila. 6, Pa.

1831—120TH ANNIVERSARY—1951

METSO

metso® *cleaners*

Schedule of Events

November

12–14—Grocery Manufacturers of America, 43rd annual meeting; Waldorf-Astoria Hotel, New York City.

12–15—National Automatic Merchandising Assn.; Auditorium, Cleveland.

12–15—American Bottlers of Carbonated Beverages, annual convention; National Guard Armory, Washington, D. C.

13–16—National Assn. of Ice Industries, 34th annual convention; Shamrock Hotel, Houston, Tex.

26–Dec. 1—Chemical Industries, 23rd exposition; Grand Central Palace, New York City.

December

2– 5—American Society of Refrigerating Engineers, 47th annual convention; Hotel Roosevelt, New Orleans.

3– 5—Vegetable Growers Assn. of America, 43rd annual convention; Hotel Claridge, Atlantic City.

January

16–18—Canadian Food Processors Assn.; Chateau Frontenac, Quebec.

19–23—National Canners Assn., National Food Brokers Assn., and Canning Machinery and Suppliers Assn., annual convention; Auditorium, Atlantic City.

tative order published in Oct. 1950; exceptions filed in Jan.

3. *Canned mushrooms,* amendment, standards of identity and fill. Expected soon; tentative order published in Feb.; exceptions filed in April.

4. *Fruit preserves, jellies, and butters,* amendment, standard of identity. Expected soon; tentative order published in July; exceptions filed in Aug.

5. *Canned tomatoes,* amendment, standard of identity. Expected soon; tentative order published on page 9699, Sept. 22 *Federal Register,* proposing deletion of required label declaration of optional ingredient (a) (3); written comments received until Oct. 22.

Standard Corrected

Evaporated milk, amendments, standard of identity. Typographic error in final order was corrected by publication on page 9457, Sept. 18 *Federal Register,* so that sub-paragraph (1) in section 18.520 (a) reads as follows: "Disodium phosphate or sodium citrate or both, or calcium chloride, added in a total quantity of not more than 0.1 percent by wt. of the finished evaporated milk."

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S.

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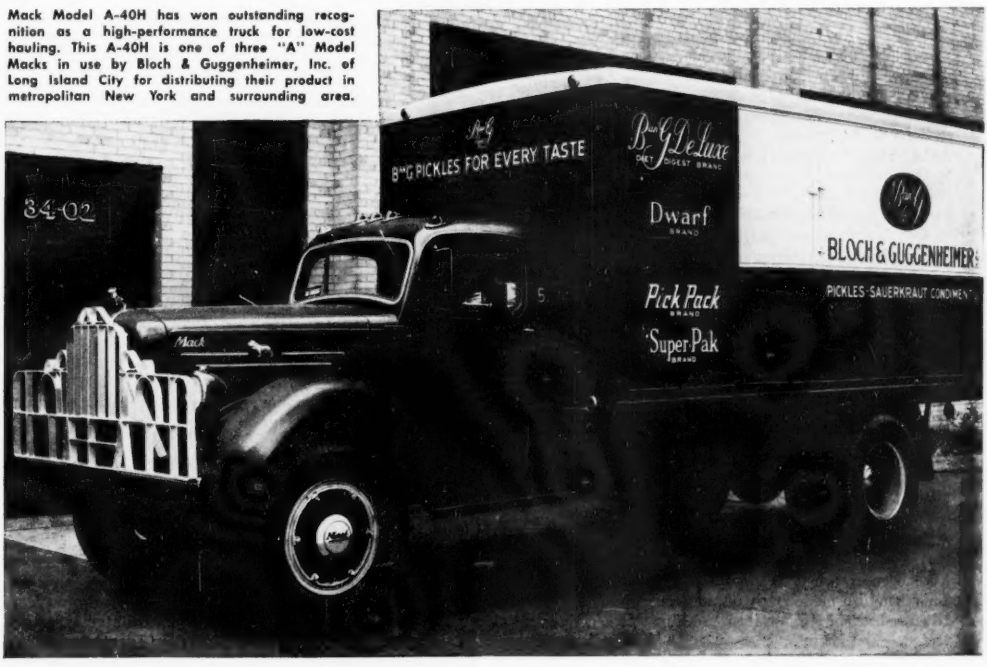

Grade Standards and related activities include the following:

Frozen diced carrots, new, page 9298, Sept. 14 *Federal Register*, effective Oct. 14.

Frozen field peas and frozen blackeye peas, new, page 9300, Sept. 14 *Federal Register*, effective Oct. 14.

Frozen apples, revised, proposed, page 9316, Sept. 14 *Federal Register*, written comments received until Oct. 14.

Frozen spinach, fourth revision, page 9715, Sept. 25 *Federal Register*, effective Oct. 25.

Canned pears, third revision, proposed, page 9726, Sept. 25 *Federal Register*, written comments received until October 25.

Canned beets, fifth revision, page 10013, Oct. 2 *Federal Register*, effective Nov. 1.

Beans (Mung and Yelloweyes), revised, proposed, page 10162, Oct. 5 *Federal Register*, written comments received until Oct. 20.

Eggs and egg products, sampling, grading, labeling, and packaging regulations recodified (without change), page 10193, Oct. 6 *Federal Register*.

Pork carcasses and swine (barrows and gilts), new, proposed, page 10217, Oct. 6 *Federal Register*, written comments received until Apr. 3, 1952.

Butter Regulations Revised

Publication of the new process butter regulations, relating to sanitary inspection, appeared on page 10149 of the Oct. 5 *Federal Register*.

Novel feature in this publication was the discussion of written comments received following publication of the proposed amendments in July. For example, use of viscose or plastic containers for butter, in addition to metal or wood containers, was accepted by the Secretary of Agriculture. However, he held out on the requirement for "metal containers (which) have smooth inner surfaces without pockets and recesses . . . because experience has demonstrated the impracticability of properly cleaning metal containers which are not so constructed."

Correction

In final page makeup of the Oct. FE article, "Foolproof Control", two pairs of photos inadvertently were interchanged. The two pictures in the center of page 78 should have been over the captions at the top of page 79, while these photos on 79 belonged with the captions on 78.

In this article, too, the name of the maker of the multi-tier cooler should have been National Equipment Corp. This firm also made many of the other advanced machines described and illustrated.—The Editors.

Working Out the Fruit Bugs

—*Continued from page* 84

cleaned every 4 or 8 hr.; other units only once a day. A complete clean-up of all except evaporative equipment, using detergents, high pressure water and chlorinated rinses every 24 hr., appears to be general practice.

Special Cleaning Agents

Much consideration has been given to the use of special detergent and sanitizing agents in maintaining process conditions that will satisfy the micro-biologist. Usually, the detergents are of varying degrees of causticity necessary to remove the glucoside-pigment films—generally deposited on surfaces exposed to citrus juices.

Solution-lifting steam guns have been used in the past to apply these agents, but recently there has been a swing to high pressure water systems. By introducing detergents into a special high pressure water supply, plants can now successfully clean their equipment with solutions at only slightly elevated temperatures. This reduces humidity in the processing rooms and minimizes build-up of mold on walls and ceilings.

The installation can be very efficient if the high pressure pump is centrally located and the detergent piped to easily accessible stations throughout the area. These stations can be equipped with twist-lock connections so that the clean-up crew can switch from the various points with portable hose and gun.

Certain pieces of equipment cannot be cleaned efficiently by this method, however. Pumps, tanks, and lines should be cleaned by recirculating the detergent through the regular piping system, using sufficient caustic to dissolve the deposits. Following this, the system should be rinsed with chlorinated water until the effluent is negative to phenolphthalein.

Evaporator shutdowns may be predicated by their basic design—with most units on a 72 hr. schedule. This phase of plant sanitation deserves considerable attention due to variations in the process microflora over a season. Also an effective sanitation program will control any build-up trends ahead of the evaporators. But one must consider the prolonged retention afforded any group of microorganisms within the evaporator itself.

A careful study should be made of each unit, and design deficiencies should be eliminated or carefully watched. This is particularly true when differential counts reveal an increasing number of acid formers in the process. Such types are capable of rapid growth under suitable conditions, particularly within the first stage of concentration. It is not enough to know the total count on concentrate leaving the evaporator; each stage should be sampled with particular regard to the initial step.

Holding tanks afford another major source of contamination. Even if refrigeration is employed, there is still a hazard if juice levels drop and leave a body of foam on the equipment surface. Population levels can increase at a rapid rate, and large numbers of microorganisms can be entrained in "sound" juice when a new surge in levels permits incorporation of the stagnant foam.

Swab checks, employed in conjunction with total counts on juice subjected to such conditions, are useful in establishing the frequency of clean-up of specific equipment.

Another critical point in the process is the blending operation—especially if continuous automatic equipment is used. Here, as in the evaporators, design should be carefully evaluated. Checks before and after the blending apparatus should reveal the necessity for periodic attention.

The filler bowls constitute the last major point of concern. Continuous operation for long periods can create a problem, due to the same fluctuation in levels as discussed above. Further, those machines fitted with piston rings deserve special attention. Here, too, swab checks and before-and-after total counts furnish valuable backing to any clean-up suggestions.

Ways and Means of Sampling

Today, routine examination of the canned product is standard in all plants. The frequency of sampling has received much attention in the past few years, and presently appears to be predicated on the individual firm's experience and resulting concept of product quality.

Also, there appear to be several methods of reporting product counts. For the sake of uniformity, this author suggests that the counts be presented on the basis of total microorganisms per ml. reconstituted juice. Then all line checks involving the concentrated product would also be on a single-strength basis. Adoption of this standard system would save much time in the reporting and analyzing of results.

Technics vary considerably in regard to sample size and dilution practices.

(*Turn to page* 204)

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No critical evaluation will be attempted here. But it may be noted that some trends are apparent—for example, away from the use of buffered diluting water in preparing for total counts. This practice is no longer in widespread use, since a majority of investigators have concluded that serial dilutions of the product present no pH problem. The more common dilutions used in the industry are of such a magnitude as to render the use of buffering materials unnecessary.

Much evidence has also been accumulated on the effect of time lag between preparation of the dilution and pouring of a plate. Early practice was centered on the completion of a number of dilutions before transfer and pouring. However, recent industry research has shown the necessity of pouring the plate within 5 min. of preparation of the dilution, if the true count is to be obtained. Otherwise, organisms may be killed at room temperature that might otherwise remain viable in the frozen product. And it is conceivable that some of these organisms may become sufficiently adapted to the environment to exhibit growth.

The heterogeneous nature of the product makes it logical to consider the mode of freezing as a factor influencing distribution of microorganisms. Some plants rapidly chill the product to 18 to 20 deg. F. before filling, and subsequently freeze in air-blast immersion-type tunnels. Others fill at 40 to 50 deg. F. and then proceed with freezing.

If this latter practice is coupled with static freezing in an air blast or immersion system—*i.e.*, the cans are not agitated—there is a good possibility of stratification with the establishment of a metacryotic core. This core will contain a relatively high concentration of sucrose.

McFarlane presents evidence[9] that several microorganisms survived better in orange juice with high-sucrose, added levels than they did in the unsweetened controls at 0 deg. F. It is conceivable that a can of stratified product might present a sampling problem. Therefore, the larger the sample, the more reliable the data.

The subject of what is a minimum sample has been a controversial one. Today's practice ranges from 1 ml. concentrate diluted with 99 ml. water (with subsequent serial dilutions) to 5 ml. or more of sample diluted with three volumes water (with subsequent serial dilution).

Orange Serum Formula

Suitability of various media used in plating citrus concentrate samples is greatly complicated by the varied nature of the microflora, most being foreign to the substrate.[3] Hill and Faville[10] have compared the efficiencies of various plating media used for the estimation of microorganisms in citrus juices. Representative ratios of bacteria and yeasts were obtained by the use of washed suspensions of cells. Platings were made on ten media, representing the majority of those in commercial use, plus two acidified to pH levels suitable for yeast and mold growth only. The media composition varied from that suitable for yeast growth to relatively high pH (7.3) media designed for bacterial growth.

Although these studies indicated that four specific media, with pH values ranging from 6.7 to 7.3, gave comparable results in showing total count trends over a wide bacteria-to-yeast ratio spread, they clearly show the limitations of such media as single sources of information. Of great importance is the data here on the unsuitability of certain yeast media when the preponderance of microorganisms present are bacteria.

The authors conclude that: "No single medium will support the growth of all types of microorganisms equally well, and the possibility always exists that abnormally high counts might not be reflected during routine examinations if a single plating medium is used."

The work of the above authors did not include orange serum agar, which came into widespread industry use during the 1949-1950 production season. Earlier studies by a majority of industry and governmental workers suggested that yeast media were not good indicators of total counts, particularly when conditions favored the presence of acid-forming bacteria. The research departments of American Can Co. and Continental Can Co. devoted much time to surveys leading to the following formulation of orange serum agar:

TEMPLATE frames area for swab check to determine microbial count on equipment.

Preparation of Orange Serum

Heat 1,000 ml. of freshly extracted orange juice to approximately 200 deg. F.

Add 30 grams of filter aid, and mix thoroughly.

Filter through a Buchner funnel containing coarse filter paper and a layer of filter aid.

Discard first few ml. of filtered serum.

If serum is not to be used immediately, it may be sterilized 30 min. in flowing steam (212 deg. F.)

Orange Serum Agar, pH 5.4

Tryptone	10gr.
Yeast extract	3gr.
Dextrose	5gr.
K_2HPO_4	2.5gr.
Bacto-agar	20gr.
Orange serum	200ml.
Distilled water	800ml.

No pH adjustment of the distilled water is necessary. Dissolve and sterilize mixture in the autoclave at 15 lb. pressure (250 deg. F.) for 15 min.

V. S. Troy[11] employed orange serum agar at pH 5.4. Using suspensions of (a) yeasts, (b) *lactobacilli*, and (c) *leuconostoc*, he obtained 99 percent of the maximum count at 48 hr. when employing a ratio of 75 percent (a) and 12.5 percent each (b) and (c). A count of 92 percent was obtained with the ratio 50 percent (a) and 25 percent each (b) and (c). A yield of 94 percent of the maximum was obtained at a ratio of 25 percent (a) and 37.5 percent each (b) and (c).

Considering the work of the above authors, it would appear that several good total-count media are available. Recent evidence pointing to the spoilage potential of certain acid-formers is worthy of consideration. Some of these organisms have limiting pH values very nearly that of orange juice. Since they are fastidious in nutrient requirements, a separate medium for their evaluation is indicated, if determination of true members are desired.

We thus have a concept of two media—one functioning as a general-count trend medium, and the other highly selective for acid-forming bacteria. The first medium should give excellent opportunity to evaluate the over-all sanitation picture. The other may serve as a warning signal for dangerous build-up trends on the part of specific groups of microorganisms.

For the general count work, orange serum agar at pH 5.4 or dextrose tryptone agar at pH 6.7 would be suitable. The other medium is more difficult of selection, because of the aforementioned fastidiousness of the acid-formers. At the present time, McCleskey's sucrose agar at pH 6.5 appears to be highly selective for the genus *Leuconostoc*. Several media under study show promise as specific

substrates for catalase negative organisms.

More Light on E. Coli

We now turn to the detection of organisms of public health significance. The literature is unanimous in concluding that intestinal pathogens do not survive a significant period of time in orange juice at 100 deg. F. However, Beard and Cleary[13] demonstrated that a temperature of 24.8 deg. F. will allow survival of several known intestinal pathogens for periods varying from 50 to 170 hr. when inoculated into single-strength orange juice at pH 3.5. Schrader and Johnson[18] concluded that cultures of *E. coli* did not multiply in orange juice at any temperature. But the death rate decreased with each drop in storage temperature.

The difficulty and impracticability of isolating specific pathogens led to the early establishment of the isolation of coliform bacteria as a criterion of fecal contamination. Since that time much differential work has been done on this group of organisms, and today we find that *Standard Methods for the Examination of Water and Sewage*[14] recognizes only those organisms having IMViC reactions of + + − − or − + − − as being of fecal origin. This eliminates the omnipresent *Aerobacter aerogenes* as an index of contamination from such sources. The public health status of *E. coli*, however, has brought about much work on its detection in citrus products.

In the early search for those coliforms in citrus juices, large numbers of false presumptive tests were encountered due probably to the presence of dextrose in the sample or to the presence of lactose fermenting yeasts. In 1935, Vaughn and Levine[15] suggested a selective medium containing boric acid for the detection of the genus *Escherichia* and the inhibition of *Aerobacter* and *Citrobacter*. Their work was confined to the study of pure cultures, but it was indicated that this medium might be useful in the suppression of non-fecal coliforms that may be present in citrus products. Darby and Mallmann[16] subsequently reported that the use of tryptose accelerated the reproduction of coliforms during the early logarithmic growth phase. They also indicated [17] that sodium lauryl sulfate was a highly selective non-inhibitive wetting agent for members of the coliform group.

Beisel and Troy[18] adapted the Vaughn-Levine medium for use as a screening presumptive test in the examination of frozen concentrated orange juice. They found that when proper conditions of temperature and boric acid concentration were observed, the number of false presumptive tests was drastically reduced as compared to duplicate samples in standard lactose broth.

Coincident with this work were studies by the research department of American Can Co. using a modified lauryl sulfate tryptose broth. The phosphate concentrations were changed and boric acid was added to the media.[19] Other inhibitive media have been employed, such as brilliant green bile; but the two aforementioned media have given the best results to date.

Tentative Concentrate Procedure

Here again, much consideration has been given to the size and preparation of the sample. It is commonly agreed that the sample must be substantially neutralized before introduction into the presumptive media. Size of the sample appears to be dictated by individual thinking, but as before, we are concerned with the fact that the larger sample yields better results.

The Committee on Microbiology of Citrus Products made a recommendation for tentative procedures in the examination of frozen concentrated orange juice in which 10 ml. of neutralized reconstituted juice is inoculated into 30 ml. of screening presumptive medium. This medium can be either the Vaughn-Levine, modified Mallmann, or Eijkman formula.

Faville,[20] in a study of the relative efficiency of several liquid presumptive media, compared standard lactose broth, brilliant green bile, lauryl tryptose broth, and the Vaughn-Levine boric acid broth. Working with 16 strains of *E. coli*, he studied growth at 99 deg. F. and 109 deg. F. At 99 deg. F., brilliant green bile and lauryl tryptose broth were as efficient as standard lactose broth—*i.e.*, 100 percent gassing in 48 hr.

The Vaughn-Levine boric acid medium demonstrated 87.5 percent gassing at the same period. At 109 deg. F. and 48 hr. incubation, however, standard lactose broth was only 75 percent efficient, brilliant green bile 43.8 percent, and the Mallmann and Vaughn-Levine media were 87.5 percent efficient.

Although this work was done on a limited number of organisms and does not necessarily reflect what would occur if the substrate were orange juice, it does provide data worthy of more consideration.

There has been considerable discussion also as to the true identity of those organisms that show a confirmatory pattern after isolation from the product. Many organisms noted have been delineated as gram negative, nonspore forming, motile rods that ferment lactose, show distinctive characteristics on eosine methylene blue agar, and have a + + − − IMViC pattern

(*Turn to page* 207)

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Men & Companies

G. C. Pound, executive vice-president of Kraft Foods Co., was elected president at a recent meeting of the board of directors.

Industry

American Bakeries Co., Birmingham, Ala., has completed a $500,000 modernization program at its Houston plant. Addition includes a 180-ft. oven and new auxiliary equipment, such as transfer belts, dough-cutting machines, and wrapping machines.

Associated Blue Lake Green Bean Canners, Inc., a non-profit organization designed to promote sale of canned green beans, has been formed by three canneries in the Salem, Ore., area. Involved in the deal are Paulus Bros., and United Growers, Inc., both of Salem, and Stayton Canning Co., Stayton, Ore.

Borden Co. has begun construction of a new ice cream distribution building, said to be one of the biggest in the U. S. in North Hempstead, L. I., N. Y.

Cabells, Inc., at its Dallas headquarters, has completed a $325,000 program designed to double its milk output.

Canadian Bakeries, Ltd., has elected to its board of directors H. M. Long and J. M. R. Corbet.

Capitol Frito Co., Inc., plant in Bethesda, Md., was destroyed by fire, entailing a loss of $100,000.

Clinton Foods, Inc., has accepted the resignation of Charles W. Metcalf as president and director. Richard N. Moss will serve both as president and chairman of the board until a permanent successor is chosen.

College Inn Food Products Co., has added a new plant to its facilities which, according to manufacturer, will increase production capacity by 73 percent.

Concentrates Marketers, Inc., has named R. J. Moone, Gerald F. Morrow, and Joseph L. Bachand as vice-presidents.

Crosse & Blackwell Co. has appointed J. Beaver Morgan district sales representative of its Frozen Food Div. in Alabama, the Carolinas, eastern Tennessee and Georgia.

Dairy Guild of America is currently conducting a program to "further better understanding of the dairy industry and aid better consumer health and living."

Denison Poultry & Egg Co., Denison, Tex., will open a new plant in Springdale, Ark. which reportedly will be one of the largest poultry processing plants in the Southwest.

Dr. Pepper Bottling Co. and the **Blue Ridge Beverage Co.,** both of Roanoke, Va., are among the firms that have made the honor roll of the 1952 United Community and Defense campaign by fulfilling or exceeding their goals.

Fairmont Foods Co. recently announced that Wells Wetherell, after a brief tour of active duty in the Navy, has rejoined the company as ice cream merchandising manager.

Fitelson Laboratories, Inc., has just been opened in New York City, for "consultation, labeling, analysis and sanitary control for the Food Industries."

Flamingo Products Co., newly-organized in Jacksonville, Fla., will establish a plant for the manufacture of ice cream cones (among other items).

Florida Citrus Commission recently named Ralph M. Henry as advertising manager for the organization. Mr. Henry was formerly merchandising manager, and in his present job, will direct the placing of $2,000,000 in various advertising media each season.

Fosgate Growers Cooperative, Forest City, Fla., at its annual membership meeting, elected to its board of directors, Ward J. Leppere and J. D. Ogden.

(*Turn to p.* 208)

Fruit Bugs

—*Continued from page* 205

—but show deviations in the extended biochemical picture, such as cellobiose fermentation and, in rare cases, maceration of vegetative tissue. There is much to suggest that many of the organisms being isolated within the industry may be of the genus *Erwinia*. Wolford and Berry[6] noted organisms, associated with the soft rot of oranges, that might belong to this classification.

Little is known concerning the origin of these coli-like organisms. Until such data can be developed, it is difficult to discuss the significance of their presence in citrus juices. The utility of standards has been well discussed by Levine,[21] speaking on the subject of "Bacterial Indices of Pollution."

Survival of these organisms of public health significance has been studied extensively by industry groups. It appears, however, that any such organisms will probably not be viable at the time of consumption of the reconstituted product.

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End (*Resume reading on page* 85)

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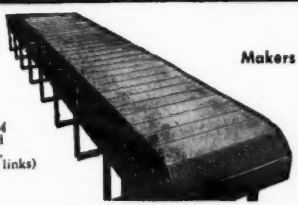

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☐ Send full details and specifications, including engineering data, on your Steel Belt Conveyors.
☐ Have your engineer call to discuss our problems.

Name_____
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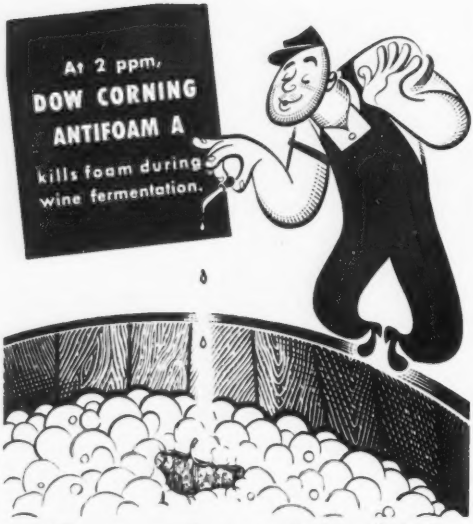

Foam's a Fraud... Kill it With

DOW CORNING ANTIFOAM A

To get the most out of your process equipment, add a trace of Dow Corning Antifoam A and use the extra space you've been wasting on foam! You'll process most of your most violent foamers, even under vacuum or continuous heat, without waste or hazardous overflow.

That's because Dow Corning Antifoam A kills foam faster and under more varying conditions than any other material known. It is odorless, tasteless and non-toxic; safe to use in food and drugs at concentrations up to 10 parts per million —many times the concentrations normally required to control foams.

Indeed, effective concentrations are so low that Dow Corning Antifoam A is not only the most versatile and efficient defoamer on the market, it is also the most economical.

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Dow Corning Corporation, Midland, Michigan

Please send full information and a free sample of Dow Corning Antifoam A.

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DOW CORNING CORPORATION
MIDLAND, MICHIGAN

ATLANTA • CHICAGO • CLEVELAND • DALLAS • LOS ANGELES • NEW YORK • WASHINGTON, D. C.

General Milk Co., foreign affiliate of Carnation Co., has elected William D. Dobson executive vice-president, and Charles G. Todd vice-president.

General Mills, Inc., has appointed Durward E. Balch as vice-president and director of personnel administration, and Byrne N. Badernach as director of labor relations.

Golden State Co., Ltd. is posessor of a total of 62 medals, plus a number of special awards, for the quality of its products.

Hines-Park Foods, Inc. revealed, through Pres. Roy H. Park, that research and development work is completed for what he termed "a new superlative white bread" bearing the name of Duncan Hines.

Kingan & Co. recently announced the resignation of J. W. McElligott, vice-president in charge of sales. Bruce Ashby has been appointed general sales manager, and Dean Foster has been named advertising manager.

Flour Mills of America, Inc., Kansas City, Mo., has appointed A. L. Christman and A. G. Ehrenberger as vice-president of the Valier & Spies Milling Co. Div.

Pfeiffer's Food Products, Buffalo, N. Y. will make alterations to its building at a cost of $45,000.

National Assn. of Margarine Mfrs. recently announced that Siert F. Riepma has been elected president of the organization.

National Fisheries Institute recently dedicated its new headquarters building in Washington, D. C.

National Research Corp., Cambridge, Mass., has appointed Dr. Thomas R. Steadman to the Petrochemicals Research Dept. He will supervise the organic chemistry phases of a new research program, undertaken jointly by National Research, Electric Bond & Share Co., and United Gas Corp.

Pillsbury Mills announces three changes in its board of directors: Clark Hempstead, co-chairman and one-time company president, Max A. Lehman, and E. H. Mirick have been succeeded by H. E. Lehman, D. J. Greer, and Clyde Hendricks.

Rainier Brewing Co., San Francisco, won for the third consecutive year the California State Agricultural Society Gold Medal for the finest hops grown in California.

Charles H. Rosener has been promoted to New York division sales manager of American Home Foods, Inc.

Stokely-Van Camp, Inc., has named William H. Foster a vice-president of the corporation. He is in charge of the company's canning operations, and its subsidiaries on the West Coast.

Supreme Products Corp. has been established in Norfolk, Va., to deal in food products, along with other items. Edward L. Breeden is president of the company.

Sweden Freezer Mfg. Co., Seattle, is expected to triple production of its fresh fruit and vegetable juicer.

Valley Plant Co., Pharr, Tex., has leased the Russell Rabin Co. packing plant for the coming citrus season.

Personnel

Chester B. Biddle, Remington Ind., is new president of American Soybean Assn., succeeding John W. Evans.

C. C. Boxer has been appointed to represent the Canadian Wheat Board in Washington, D. C.

George L. Clements, president of the Jewel Tea Co., Chicago, was elected chairman of the Board of the National Assn. of Food Chains.

Charles R. Collins has joined the staff of the American Institute School of Baking as an instructor in the repair and maintenance of bakery equipment.

Paul R. Dew is now assistant manager of Fairmont Foods Co., Moorehead, Minn.

Robert M. Farr has been elected president and treasurer of the Huron Milling Co., succeeding George W. Ross, who becomes chairman of the executive committee.

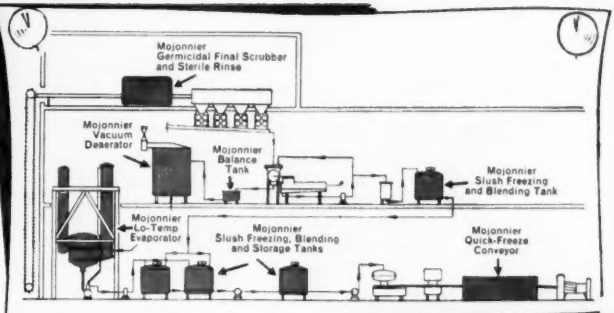
Dr. David Green has been named to head the newly es-

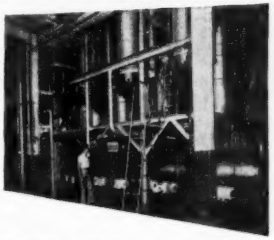
Orange Concentrate Production Report:

Florence Foods *Cut Costs Well Below Florida Average*

WITH **mojonnier**

COMPLETE PROCESS PLANNING


Mojonnier Germicidal Final Scrubber and Sterile Rinse
Mojonnier Vacuum Deaerator
Mojonnier Balance Tank
Mojonnier Slush Freezing and Blending Tank
Mojonnier Lo-Temp Evaporator
Mojonnier Slush Freezing, Blending and Storage Tanks
Mojonnier Quick-Freeze Conveyor



Flow chart above shows Mojonnier-planned frozen citrus concentrate operation at Florence Foods, Florence Villa, Florida, where costs ran well below Florida average during 1950-51 season. Photo, right, shows Mojonnier Lo-Temp Evaporator at Florence Foods.

■ Whether you plan to manufacture a new product or want to cut production costs of one already established, take advantage of Mojonnier's experienced engineering service.

■ This service helps you plan all installation details, solves problems of equipment location, building changes, and handling of product from receiving through shipping. Successful installations of the wide line of Mojonnier food cooling, heating, condensing, mixing, storage and filling equipment in leading food plants of the country add up to the valuable experience needed to help solve your problem. Let us consult with you now. Write:

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—in cans, glass or cartons . . . by hand or in any make of high-speed, automatic labeling or packaging machine . . . for small or large sizes; unusual shapes; coated, foil or regular stock . . . to Government or your own specifications!

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LAP-LABELING • CASE-SEALING • LAGGING

With 65 years of pioneering in the making of adhesives, more than 10,000 formulas have been developed in our five laboratories. Today we serve the leaders in a hundred industries . . . We invite the opportunity to submit samples for you to test in your own plant—under your particular working conditions—for your specific requirements.

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65 YEARS OF PIONEERING

THOROUGH MIXING FASTER COOKING AT LOWER COSTS

Actual production figures show that processing costs go down, efficiency goes up with Hamilton Stainless Steel Steam-Jacketed Mix-Cookers. Built to ASME Specifications, Hamilton Stainless Steel mix-cookers are available with single or double action agitators. Stock specifications include maplewood scrapers, but can be furnished with soft metal or plastic scrapers guaranteed not to effect taste or flavor of product.

Extra large steam jacket and fittings, plus larger draw-off, will speed operation, cut costs. (Draw-off sizes up to 4" and larger if necessary.) Investigate the Hamilton Stainless Steel Mix Cooker and Tilting Kettles today.

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Even the best foods *Taste Better* when you add a little

Huron MSG
MONOSODIUM GLUTAMATE 99+%

No Change in Formula

Over 8,000,000 lbs. of MSG is now used annually by the food industry to bring out more of the natural flavors of processed foods. No change in formula required—just add a very little Huron MSG. Why not see what MSG will do for your products—how much it will enhance the natural flavors? Test samples and information on use of Huron MSG in your products, supplied on request. Write us—

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161 E. Grand St. Chicago 11, Ill.
13 E. 8th St. Cincinnati 2, Ohio
383 Brannan St. San Francisco 7, Cal.

Douglas T. Orton is new secretary of Borden Co., succeeding the late Theodore B. Waibel.

tablished animal nutrition department in the research division of Armour and Company.

E. D. Griffin, general sales manager of Allied Mills, Inc., has been named a vice-president of the corporation.

Malvern J. Hiler was promoted to president of the Commonwealth Engineering Co. of Ohio. He was formerly executive vice-president.

Walter K. Hinds, general manager of the Sun-Maid Raisin Growers of California, was elected chairman of the California Raisin Advisory Board.

Bessie L. Hudson has been appointed home economist for the International Harvester Company's San Antonio office.

Don Johnson is new head of the Fisheries Research unit of the Washington State Fisheries Department, succeeding Norman A. Riddell, resigned.

Howard E. Lemon was recently named director of sales of Frosted Foods Co.

F. W. Lindsey has been elected a vice-president of the Better Ice Cream Co., Baltimore, Md.

Roland McHenry recently retired as president of General Mills, Inc., Star Grain Div., Chicago. He has completed 45 yrs. in the grain trade and has been active on the Chicago Board of Trade.

George A. Mohlman recently retired from active service with the Package Machinery Co., E. Longmeadow, Mass. He was chairman of the board of directors.

Thomas Peyton was recently named assistant sales manager of the commercial equipment division of Cory Corp., and will be in charge of national sales and promotion of coffee brewing equipment.

James Reed has been appointed sales promotion director of the Standard Fruit & Steamship Co.

Carl H. Rinne has been named general manager of General Electric Company's Specialty Transformer and Ballast Dept., Ft. Wayne, Ind.

L. D. Roberts, San Antonio, has been elected president of the National Pecan Shellers & Processors Assn.

David Alexander Ross is new executive vice-president of Canada Bread Co., Ltd.

Charles W. Sand, head of alcoholic beverage section of the Office of Price Stabilization, has resigned to accept a position as trade relations specialist with the Blatz Brewing Co.

W. Cordes Snyder, Jr., has been elected president and chief executive officer of Blaw-Knox Co. He was previously a vice-president of the company in charge of its Lewis Foundry & Machine Div.

Clarence J. Van Handel has been promoted to assistant master brewer of the George Walter Brewing Co., Appleton, Wis.

Associated Industry

Allis-Chalmers Manufacturing Co. recently announced the following elections and promotions: W. G. Scholl, C. W. Schweers, J. F. Roberts and W. A. Yost were named vice-presidents and G. F. Langenohl was elected treasurer and assistant secretary.

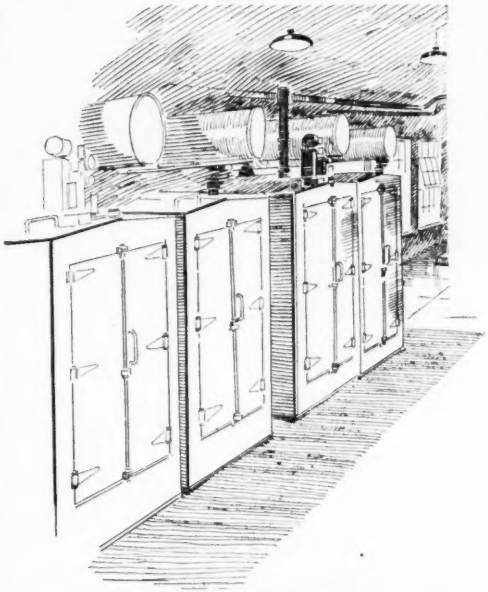
Barry Wehmiller Machinery Co. has named former president, Mrs. L. Rassieux to the office of chairman of the board.

Bemiss-Jason Corp., maker of corrugated paper specialties, has begun construction of a $750,000 factory with executive offices at Redwood City, Calif.

Borg-Warner Corp. has elected R. F. Schutz assistant treasurer of its Ingersoll Products Div.

British-American Carbon Corp. recently announced the appointments of Daniel W. Kallman and John T. O'Rourke as sales engineers in the eastern division for Delanium carbon heat exchangers.

Container Corp. of America recently announced that its



4 of the Amerio Positive Contact Plate Freezers in the plant of the Empire Fish Co.

"Our Amerio Contact Plate Freezers are doing a very good job in the quick freezing of our fish products."

So says the
EMPIRE FISH Co. of Gloucester, Mass.
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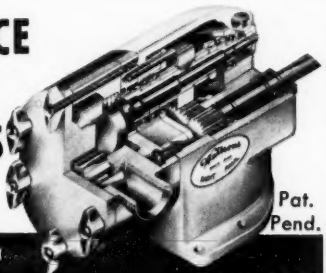
"It's the Contacts that Count"

REPLACE OLD PUMPS NOW



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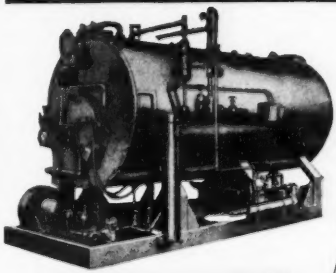

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15 to 200 lbs.

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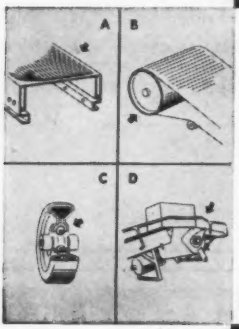
RAPISTAN POWERED CONVEYORS

ARE *Better* 3 WAYS

FLEXIBILITY

Rapistan power conveyors fit any floor plan . . . can be used in narrow aisles where other equipment would be impractical. Portable models can be rolled quickly from job to job. Stationary models are simple to install . . . easy to move when necessary



QUALITY

A. One piece, special box type steel frame . . . no welds!

B. Belt pulleys machine-welded . . . for uniform strength around hub . . . disc stays put!

C. Exclusive, Greased-for-life ball bearing conveyor wheels!

D. Nosed-over delivery at top of inclined conveyors provide smooth, safe travel for packages.

VALUE

Food processors often double man-hour output with Rapistan equipment. Many report that it pays for itself in one season—through reduced spoilage and breakage; faster, more efficient loading, unloading, processing, storing; increased working and storage space.

GET THE COMPLETE FACTS . . . Field reports give detailed information on specific savings earned by food processors. Reports and complete catalog are ready to mail to you today.

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CONVEYORS: Power or Gravity, Movable or Fixed
Also a complete line of CASTERS & HAND TRUCKS

subsidiary, Sefton Fibre Can Co., St. Louis, has opened a new plant in Piqua, Ohio.

Continental Can Co. has elected Lawrence Wilkinson and E. R. Van Meter as new vice-presidents.

Erie City Iron Works has named Thomas O. Schrader vice-president of the company, succeeding Dudley Selden.

Glyco Products Co., Inc., Brooklyn, N. Y., recently appointed Jack H. Dollinger sales manager.

Howell Electric Motors Co., Howell, Mich., has elected James F. Murphy vice-president of the corporation.

Instrument Society of America, at its 6th annual conference, elected the following national officers: Dr. Arnold O. Beckman, president; David M. Boyd Jr., vice-president; and Robert T. Sheen, vice-president.

Lassiter Corp. has established a printing plant in Atlanta to process cellophane and acetate for use in packaging bakery products, candies, meats, fruits, vegetables, and other items.

Link-Belt Co. has elected Robert C. Becherer executive vice-president of the corporation.

Lynch Corp. is opening a new western division office and warehouse in San Francisco. It will be managed by Cal B. Pierce.

Mic-Lin Co., Philadelphia, newly-formed, will specialize in machining gaskets and other shapes to close tolerances.

Pfaudler Co. has appointed Albert C. Bramer to the position of field sales representative, replacing B. E. Albair who has resigned.

Chas. Pfizer & Co., Brooklyn, N. Y., elected John J. Powers Jr. to fill a newly created vice-presidency.

H. K. Porter Co., Inc., Pittsburgh, Pa., has acquired the Buffalo Steel Co., Tonawanda, N. Y.

Stauffer Chemical Co. is constructing a large plant for the production of citric acid on an 85-acre site near Pismo Beach, Calif.

J. E. Siebel Sons Co. has begun construction of a new building on Chicago's northwest side. It will have a total floor area of 40,000 sq. ft. with a frontage of 185 ft., and a depth of 148 ft.

Union Bag & Paper Co. has made the following promotions in its corrugated container division: R. C. Chandler, to eastern sales manager; M. Madson Jr., to western sales manager, and J. Butler, to southern sales manager.

Wagner Electric Corp. recently announced the appointments of two new branch managers in the electrical division. They are M. B. Atkinson, Detroit office, and A. W. Maas, San Francisco.

Web Wire Works, New Brunswick, N. J., was recently purchased by the Carpenter Steel Co., Reading, Pa.

Worthington Pump & Machinery Corp. has named the following seven plant executives to new posts: George P. Passmore, John Burlick, A. M. Tullo, W. D. Sizer, George F. Habach, Max A. Heyman, and Everett Schmachtenberg.

Deaths

Thomas H. Cross, 87, former head cattle buyer for Armour and Company.—Sept .10.

J. W. Davis, 91, director of the Fruit Dispatch Co., Summit, N. J.—Aug. 28.

Frederick George Evans, 82, chairman of the board of Canadian Canners, Ltd., Vancouver, B. C.—Aug. 29.

Earl H. Glueck, 57, president and founder of E. H. Glueck Produce Co., St. Louis.—Sept. 11.

Sol S. Goffin, 84, president of Matanzas Packing Co., Jacksonville, Fla., Fernandina, Fla. —Sept. 14.

John C. Cain, 62, chairman of the eastern division, Kellogg Sales Co., Battle Creek, Mich. —Sept. 10.

Frederick Daniel Rucker, 62, vice-president and general manager, Allied Drug Products Co., Chattanooga, Tenn. —Sept. 9.

George W. Shannon, 80, former director and vice-president of Robert Gair Co., Inc., Brooklyn, N. Y.—Sept. 25.

Philip G. Sprague, 51, president and founder of the Hostess Products Corp., New York City.—Sept. 23.

Axel W. Stromberg, 53, superintendent of transportation, Chicago Milk Div. of the Borden Co., Chicago.—Aug. 27

Clifford H. Titus, 50, Washington district manager, Birds-Eye Div. of General Foods Corp., Washington.—Sept. 14.

Theodore B. Waibel, 57, secretary of the Borden Co., Great Neck, N. Y.—Sept. 16.

This Machine "TAKES THE CAKE"...

and wraps it OVEN FRESH in sales appealing PROTECTIVE PACKAGES

No matter how odd the shape . . . how delicate or fragile the product!

SAFEGUARDS AGAINST: —

- DRYNESS
- DUST-DIRT
- MOISTURE
- MOLD
- FLAVOR-LOSS
- VERMIN

There's no crushing or squeezing of even the most delicately filled cakes or rolls — or breakage of fragile cookies and crackers when you package on the automatic Campbell Wrapper. Our "float" method of continuous feed wrapping is the answer. Your products reach their market "oven fresh" too, because longitudinal heat or glue sealing plus air-tight folded and crimped ends *keep moisture in or out* — where you want it. In addition, your production reaches new heights, too, for this modern machine *wraps up to 130 units per minute* — and in single or multiple product units! Saves labor, too — in most cases requiring only one operator to feed and one to pack. Machine uses materials of all types and is available with straight, L, or hopper feed. Investigate the Campbell Wrapper before you consider any other. You'll have a *better* package — at *lower* cost.

We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.

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Wraps products of all shapes . . . and numerous sizes

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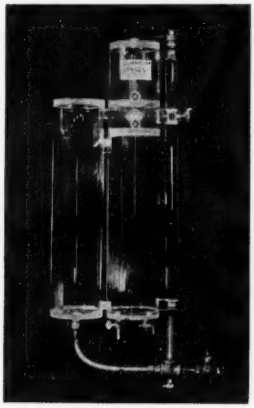

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- Process Water
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Recent Inventions

Apparatus for Coating Candy Bars Including Downward Inclined Shaking-Conveyor—*S. C. Petrilli, Chicago, to General Candy Corp. No. 2,551,849. May 8, 1951.*

Process for Drying Macroni Comprising Preliminary Heating at 100-200 Deg. F. for 2 Min., Heating at 200-300 Deg. for 4-7 Min. Passing Through Enclosed Sweating Chamber for 10-25 Min., Then Heating at 200-300 Deg. for 4-7 Min. in Continuous Flow Sequence—*B. S. Scotland, Joliet, Ill. No. 2,552,120. May 8, 1951.*

Process for Making Oat Cereal Flakes by Cooking Dough Under Pressure and Kneading, Partially Drying Under Vacuum, Forming and Toasting—*E. G. Rupp, Clarendon Hills, Ill., to The Quaker Oats Co., Chicago. No. 2,552,291. May 8, 1951.*

Continuous Food Cooking Apparatus With Means for Moving Food Particles Through Cooking Liquid by Series of Intermittently Dipping Impellers—*F. M. McBeth, Harrisburg, Pa., to Macbeth Engineering Corp. No. 2,552,441. May 8, 1951.*

Concentrating Solutions by Removal of Crystallizable Solvent in Series of Separations at Progressively Lowered Temperatures—*G. L. Cunningham, Dayton, Ohio to The Commonwealth Engineering Co., Dayton. No. 2,552,523. May 15, 1951.*

Cheese Press Composed of Frame, Ram, and Moving Cylinder Which Locks in Place and Exerts Hydraulically Applied Pressure—*N. R. Burrell and G. L. Thomson, Hawera, New Zealand, to The National Dairy Assn. of New Zealand, Ltd., Wellington. No. 2,553,035. May 15, 1951.*

Frozen Food Thawing Indicator Consisting of Sealed Transparent Enclosure Containing Hydrated Potassium Tri-Iodide, Soluble Starch and Diastase Applied at Below Freezing—*S. Hoffman, Buffalo, N. Y., to I. N. Rosem (one-third) and E. L. Cohen (one-third). No. 2,553,369. May 15, 1951.*

Continuous Baking Pan Greasing Machine Comprised of Tunnel Conveyor and Multiple Pneumatic Sprays—*A. Foster, Birmingham, England, to S. Bradford & Sons, Ltd., Hockley, Birmingham. No. 2,553,408. May 15, 1951.*

Nutritious Soluble Powder Made by Lixating Material From Coffee and Tea With Citric Acid, Concentrating the Extract, Neutralizing, Adding Sugar and Milk, Treating With Alkaline Solution and Drying—*F. Neef, Zurich, Switzerland. No. 2,553,467. May 15, 1951.*

Bacon Cured by Immersing in Low-Temperature Antioxidant Solution for 8-12 Hr., Surrounding Pieces With Moving Curing Brine for 5-10 Hr. at Higher Temperature, Smoke Drying for 6-10 Hr.—*S. L. Komarik and L. N. Hall, Chicago, to The Griffith Laboratories, Inc. No. 2,553,553. May 15, 1951.*

New Composition Milk Powder Containing 1 to 5 Percent Calcium Salt Selected From Calcium Acid Lactate and Calcium Lacto-Phosphate With Corn Starch and Calcium Sulphate as Stabilizing Agents—*F. F. Hansen, Pittsburgh. No. 2,553,578. May 22, 1951.*

Sterile Evaporated Milk Stabilized by Adding High-Temperature Sterilized Portion to an Unheated Portion—*S. R. Park, Toledo, Ohio, to W. E. Mallory & Co., Ann Arbor, Mich. No. 2,553,783 May 22, 1951.*

Apparatus for Dispersing Vitamin-Carrying Mediums Into Food Products Consisting of Fluid Measuring Cylinder With Reciprocating Piston for Intake and Ejection of Fluid—*A. C. Richardson, Berkeley and J. E. Dimick, El Cerrito, Calif., to California Packing Co. San Francisco. No. 2,553,788. May 22, 1951.*

Continuous Evaporating Apparatus Utilizing Built-In Means of Plate Heat Exchange—*J. A. Cross, Westerville, Ohio, to Mojonnier Bros. Co., Chicago. No. 2,554,138. May 22, 1951.*

Protein Modified to Improve Whipping Property by Heating Aqueous Suspension at pH above 10 to 50-100 Deg. C. in High Oxygen Atmosphere—*H. Wolff, Decatur, Ill., to A. E. Staley Co. No. 2,554,479. May 22, 1951.*

Quick Freezing Method Utilizing a Container-Carrying Tube Inside an Expansion Chamber—*S. C Craig, Vancouver, B. C., Canada. No. 2,554,560. May 29, 1951.*

Process of Canning Seafood Free From Struvite Crystals—*E. P. McFee, Gloucester, and J. A. Peters, Rockport, Mass., to Gorton-Pew Fisheries Co., Ltd., Gloucester. No. 2,554,625. May 29, 1951.*

Salad Oil With Intensified Flavor

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

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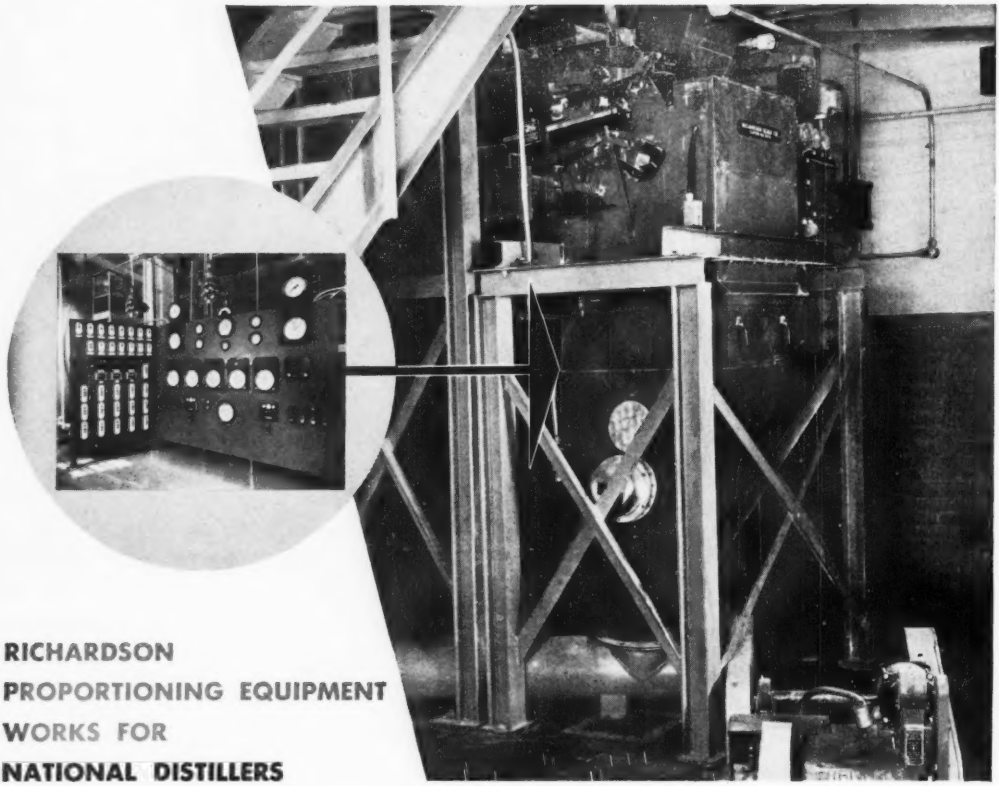

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Richardson

MATERIALS HANDLING BY WEIGHT

6768

Produced by Aging and Fermenting Ripe Olives in Dilute Salt Solution for 6 Months, Grinding, Expressing, Separating—*S. Musher, New York City, to Musher Foundation Inc.* No. 2,554,872. *May 29, 1951.*

Pickle-Slicing Machine Comprising a Frame and Rotating Grooved Feeding Drum With Overlying Knives Extending Into Grooves—*I. C. Morgan, Lewiston, Ida.* No. 2,554,918. *May 29, 1951.*

Lactose Recovered by Subjecting Whey to Cationic Exchange Material, Adjusting pH, Heating to Coagulate Proteins for Separation—*A. E. Wallace, Columbus, Ohio, to M & R Dietetic Laboratories, Inc.* No. 2,555,211. *May 29, 1951.*

Processing Foods in Loosely Sealed Containers in Steam Pressure Retort With Superimposed Air Pressure, During Heating and Cooling Cycles—*K. L. Ford, Muncie, Ind., to Ball Brothers Co. Inc.* No. 2,555,230. *May 29, 1951.*

Process of Canning Fish and Shellfish Incorporating Water Soluble Glassy Alkali Phosphate to Suppress Crystallization of Struvite—*E. L. Kreidl, Boston, and E. P. McFee, Gloucester, Mass., to Gorton-Pew Fisheries Co. Ltd.* No. 2,555,236. *May 29, 1951.*

Soluble Coffee Product Comprising Intimate Mixture of Normally Hygroscopic Powdered Coffee and Polyvinyl Alcohol—*H. H. Bogin and R. D. Feick, Detroit, to Parke, Davis & Co.* No. 2,555,466. *June 5, 1951.*

Insoluble Edible Proteinacious Material Derived by Concentrating Whey to 25-55 Percent Solids, at pH 6.0-6.6, Heating at 200-280 Deg. F.—*P. F. Sharp, Piedmont, D. D. Peebles, Hillsborough, and A. M. Besemer, Alameda, Calif. to Golden State Co., Ltd., San Francisco.* No. 2,555,514. *June 5, 1951.*

Irregularly Shaped Pieces of Foodstuff Packaged in Uniform Manner Utilizing Removable Rigid Supporting Structure Having Desired Dimensions—*B. A. Fairbank, Cambridge, Mass., to Dewey & Almy Chemical Co., North Cambridge.* No. 2,555,584. *June 5, 1951.*

Stabilizing Composition for Ice Cream Containing Carboxymethylcellulose, Irish Moss Extract, Soya Whipping Protein, Potassium Bicarbonate, Sodium Citrate and Corn Starch—*E. F. Glabe, Chicago, to Food Technology Inc.* No. 2,555,849. *June 5, 1951.*

Apparatus for Separating Starch From Gluten in Dough Consisting of Inclined Trough, Screw Conveyor and Means for Washing Starch Slurry Counter to Interlocking Conveyor—*J. J. Von Edeskuty, Minneapolis, and J. F. Zalar, St. Paul, to General Mills, Inc.* No. 2,555,908. *June 5, 1951.*

Apparatus for Carbonating Beverages Including Method of Vibrating container Being Gassed—*P. Kollsman, New York.* No. 2,556,038. *June 5, 1951.*

Brewers' Wort Prepared by Passage Through Two Sides of Regenerative Heat Exchanger at Above Atmospheric Pressure and Partial Self Evaporation in Open Vessel—*R. Seligman and S. W. T. Paine, London, England, to The A. P. V. Co. Ltd., London.* No. 2,555,938. *June 5, 1951.*

Processed Meat Product, Coated With Wax Having Melting Point of 150-170 deg. F. and Containing 1 to 4 Percent Polyethylene—*A. E. Irvine, Tenafly, N. J., to Union Carbide & Carbon Corp., New York.* No. 2,556,278. *June 12, 1951.*

Starch Produced by Centrifuging Concentrate From Suspension and Mechanically Disintegrating Concentrate, Then Reseparating to Remove Solid Impurities—*C. G. Eckers, Stockholm, Sweden, to Aktiebolaget Separator, Stockholm.* No. 2,556,322. *June 12, 1951.*

Lactic Cultures in Milk Stimulated by Incorporating SO_2 in Molar Proportion of .0001-.001—*A. B. Storrs, Palos Heights, Ill., to Armour and Company, Chicago.* No. 2,556,454. *June 12, 1951.*

Treating Citrus Peel by Disintegrating and Wet-Washing, Cooking and Concentrating Under Partial Vacuum, Adding Sugar, Then Crushing and Aerating to Disperse Bitter Components—*J. H. Forkner, Fresno, Calif.* No. 2,556,579. *June 12, 1951.*

Beverage Consisting of Cocoa Butter and Chemically-Combined Br Dispersed in Aqueous Liquid Medium, Specific Gravity of Dispersal Being Equal to That of Drink.—*F. M. Boyles, Baltimore, to Cloverdale Spring Co.—Baltimore.* No. 2,556,792. *June 12, 1951.*

Continuous Retort Temperature Control Method Utilizing Air-Actuated Motor to Engage Clutch of Container-Advancing Reel in Retort in Accordance With Temperature—*J. G. Ziegler, Walnut Creek, Calif., to Taylor Instrument Cos., Rochester, N. Y.* No. 2,556,955. *June 12, 1951.*

Starch Separated from Gluten by Mixing Drum With Ordinary Wheat Flour, Adding Gluten-Bearing Water to Form Dough, Feeding and Mixing Dough Through Series of 3-Delay Pools, Agitating, Sieving, Fermenting and Rectifying Separated Starch Water—*A. K. Kilander, Gibraltar, Mich., to Trenton Chemical Co., Trenton, Mich.* No. 2,557,032. *June 21, 1951.*

Don't take chances with product contamination. Use barrels and drums of Enduro—the lustrous metal that is inert to most chemical and food products—that is sanitary and easy to clean—that is resistant to corrosion—that is tough and strong—that is economical to use because it lasts so long.

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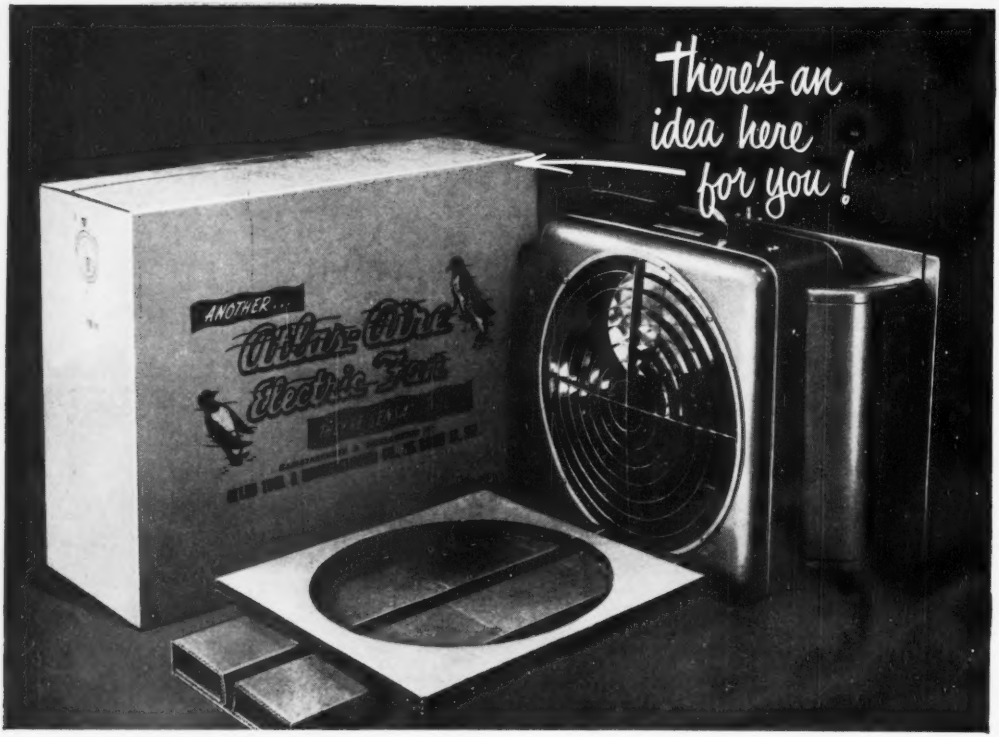

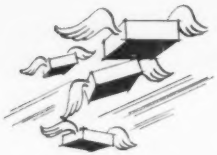

Fans breeze through the shipping department in this H & D corrugated shipping box

Time spent packing goods for safe shipment often is a sizeable business expense—and with highly seasonal products, packing time can be an actual production bottleneck. The makers of Atlas-Aire fans solved their rush-season packing problem with this H & D corrugated box. Built-up pads replace the time-wasting packings formerly used, and protect the fans so well that damage claims now are negligible.

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Agricultural Apparatus

For agricultural products, line of testing and handling equipment, including moisture testers, hammer mills, corn shellers, feed mixers, sieves, and other apparatus, are offered in well-bound catalog. Included are a brief description and illustration of each item, its price and application. 143 pages. —*Seedburo Equipment Co., 618-626 W. Jackson Blvd., Chicago 6.*

Dispersal Mixer

Applicable to all kinds of fluids, from thin slurries to pastes, mixer featured in Catalog 68 is stated to disperse, emulsify, and mill in one operation. 9 pages.—*Abbe Engineering Co., 50 Church St., New York 7.*

Vibrating Screens

Illustrated Book No. 2377, 20 pages, outlines vibrating screens for dry screening of light and fine materials, also liquid vibrating screens for separation of solids from liquids. Descriptive material includes information on how to select the right screen and screen cloth for maximum operating efficiency. Given are dimension tables, weights, and horsepower requirements.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Processing Pump

Employing new oil-lubricated bearing, pedestal-mounted pump for handling chemicals, liquors, corrosive materials and solutions and hot liquids, is subject of Bulletin 52B7638. Unit is available in capacities to 1,200 gpm. at heads to 250 ft. and temperatures to 500 deg. F. 6 pages.—*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee.*

Test Weight Kit

Presented in 2-page leaflet is compact weight set for testing scales, loose weights, filling machines, and packages or end products.—*The Exact Weight Scale Co., 944 W. Fifth Ave., Columbus 8, Ohio.*

Poultry Sizer

Operation of poultry processor is described in leaflet. Bird is hung on moving carrier, then weighed on scale over cooling vat. If it is within the maximum and minimum weight limits for the designated size, a mercury switch is closed by the scale's balance beam. 4 pages.—*W. F. Altenpohl, Inc., 4041 Ridge Ave., Philadelphia 29.*

Beer Clarification

Pressure leaf type filter used in beer filtration is discussed in 4-page report.—*Hercules Filter Corp., Paterson, N. J.*

Vanilla Recipes and History

The Story of Pure Vanilla is title of 32-page booklet. Various recipes requiring vanilla are included, along with photos.—*Dodge & Olcott, Inc., 180 Varick St., New York 14.*

Control Equipment

Flow Transmitter

Specifications, diagrams and photos of pneumatically operated pressure differential for measurement of flow, liquid level, liquid fuel, and absolute pressure appear in Bulletin 2551. Unit transmits proportional signals—linear with flow, or linear with pressure differential—to remote recording or indicating instruments, or to automatic control elements. 8 pages. —*Hagan Corp., Hagan Bldg., Pittsburgh 30.*

Water Heater Control

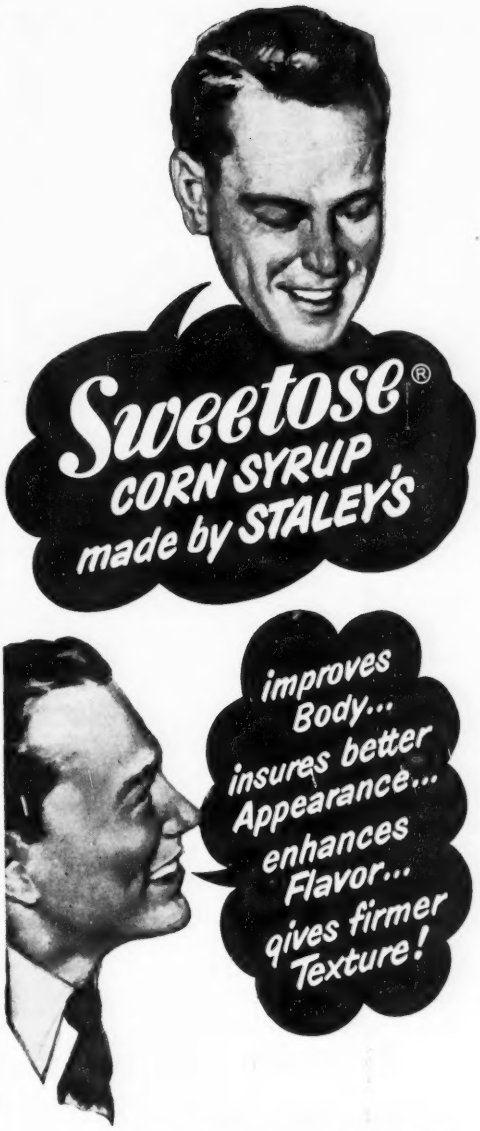
Bulletin sets forth features of heater control unit with advantages claimed as follows: 100 percent thermal magnetic safety; single port unified pilot burner and thermocouple; single dial pilot and plug valve control, and amplified snap action thermostat. —*General Controls Co., 801 Allen Ave., Glendale 1, Calif.*

Oscillograph

Multi-channel, precision recording instrument for the analysis and measurement of strain, vibration, pressure, acceleration, and other phenomena, is detailed in illustrated Technical Bulletin 1500D. 16 pages.—*Consolidated Engineering Corp., 300 N. Sierra Madre Villa, Pasadena 8, Calif.*

Meter Relay Controls

Line of automatic contact meter relay regulators controlling pyrometers and accessory equipment is



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Pie Fillings: PAYGEL produces soft cream fillings of excellent body and texture. Reduces tendency to become rubbery or shrink. Having no cereal taste or odor, PAYGEL does not mask flavor.

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PAYGEL, a *thick-boiling* starch also gives good results in ice cream cones, caramel confections, dessert mixes, custards, canned specialty foods such as chili, etc. Write, wire or phone for free sample today!

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listed in 4-page Bulletin G-51. Applications include control of furnace temperatures, feeds and speeds of machines and conveyors, radiation warning devices, crystal inspection, and automatic regulation of communications equipment. — *Assembly Products, Chagrin Falls 1, Ohio.*

Oil Valves

For controlling flow of oil to industrial oil burners, cam oil valves as presented in Catalog 704-A are said to prevent smoke by enabling operator to avoid excessive amounts of oil going to burner.—*Hauck Mfg. Co., 124-136-10th St., Brooklyn 15, N. Y.*

Solenoid Valves

Explained in Catalog 710 are valves for dependable shutoff on oil pressures up to 300 psi. of heavy as well as light fuel oils with temperatures up to 250 deg. F.—*Hauck Mfg. Co., 124-136 Kent St., Brooklyn 15, N. Y.*

Positioning Control Unit

Engineering information, dimensions, methods of operation, and various applications of pneumatic gear-driven operator for throttling control service are contained in Bulletin C-1. Unit is applicable to heavy-duty services, such as in catalyst slide valves, large gate valves, heavy dampers, blast gate valves, and Saunders patent valves. —*Conoflow Corp., 2100 Arch St., Philadelphia 3.*

Pressure Transmitters

Engineering data folders describe (1) tube pressure transmitter with range of 15 psi. to 10,000 psi., (2) gage pressure bellows transmitter with range of 0-10 in. of water to 0-200 in. of water, (3) absolute pressure transmitter with range of 0-50 mm. of mercury to 0-30 in. of mercury, and (4) differential pressure cell with range of 0-20 in. of water to 0-300 in. of water. Application data, operational features, available ranges, and wiring and case diagrams are included.—*Automatic Temperature Control Co., Inc., 5200 Pulaski Ave., Philadelphia.*

Vacuum Breaker

Data as to sizes, construction, operating pressure and relief capacity of vacuum breakers comprise Specification Sheet 413-1.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Materials Handling

Fork Lift Trucks

Surveyed in *Job Study No. 108* are methods of curtailing overall handling costs with lift trucks.—*Towmotor Truck Corp., 1226 E. 152nd St., Cleveland 10.*

Battery Servicing

Returning to full service multi-power storage batteries which have lost capacity due to formation of lead sulphate on the positive and negatives plates, is subject of 2-page data sheet.—*Gould National Batteries, Inc., Trenton 7, N. J.*

Wire Conveyor Belt

Folder sets forth a description, with flowsheet, of where and how woven wire conveyor belts can be used in a typical quick freezing plant. One section describes installations for moving produce though counter-flowing wash tank by means of a dual conveyor belt with specially suspended fittings. —*The Cambridge Wire Cloth Co., Cambridge, Md.*

Preventing Truck Failures

Recently published 16-page manual, *Care and Maintenance of Industrial Trucks*, details steps to be taken in preventive maintenance. Annual checkups are covered. There are 51 illustrations. —*The Baker-Raulang Co., 1250 W. 80th St., Cleveland 2.*

Conveyor-Loader-Stacker

Dimensional chart shows loading and unloading heights in all major dimensions for 10-, 12- and 19-ft. portable conveyor-loader-stacker. Specification data covers motors, belting, wheels, locks, guards, couplings, and optional equipment. 4 pages.—*The E. W. Buschman Co., Clifton & Spring Grove Aves., Cincinnati 32.*

Diesel Trucks

Emphasized in brochure are fuel cash savings claimed by users of diesel trucks.—*GMC Truck & Coach Div., General Motors Corp., Pontiac 11, Mich.*

Plant Supplies

Brine Cooler

Dimensions and brief description of ammonia condensers, brine coolers, Freon condensers, and dry expansion type water chillers are given in 4-page leaflet.—*The Whitlock Mfg. Co., Hartford 10, Conn.*

Blowers, Compressors

Well set-up Bulletin 0500 covers 4 types of centrifugal blowers and compressors — multi-stage, single-stage, end suction and single-stage double suction—with capacities ranging from 1,000 to 150,000 cfm. for pressures up to 150 psi. and above.—*De Laval Steam Turbine Co., Trenton 2, N. J.*

Converters

Fundamentals, operation, and construction features of induction frequency converters, in ratings from 1 to 100 kw., are included in Publication GEA-5637.—*General Electric, Schenectady 5, N. Y.*

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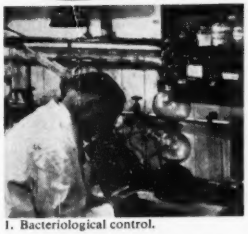

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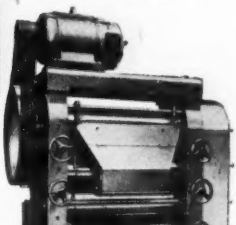

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Constant Delivery Pumps

For pressures up to 3,000 and 5,000 psi., three constant delivery axial piston pumps, covered in Bulletin 46601, incorporate balanced flat valve, simple one-piece rolling pistons, and reverse flow pressure and supercharging pressure relief valves. 4 pages.—*The Oilgear Co., 1560 W. Pierce St., Milwaukee 4.*

Wide Range Oil Burner

Constant differential system for use on oil combustion installations is offered in 4-page bulletin.—*Peabody Engineering Corp., 580 Fifth Ave., New York 19.*

Sealing Shapes

Tetrafluoroethylene resin as provided in gaskets, wedge rings, V-rings, solid rings and other gasket or molded shapes is said to have outstanding corrosion resistance, high heat stability, and anti-sticking properties. Price list and description of shapes appear in this 12-page folder type booklet.—*John L. Doré, Inc., Houston 6, Tex.*

Heat Sealer

Description of unit designed for heat sealing all thermal plastic coated and laminated packaging materials appears in folder. Unit is stated to seal foil, and other variable materials, over splices and wrinkles, and without delamination.—*Packaging Industries Ltd., Inc., Montclair, N. J.*

Power Equipment

Illustrated with photos, flow diagrams, dimensional drawings, performance chart and specification tables, 12-page catalog presents varied equipment, including control valves, pressure master controls, water regulating valves, feedwater heaters, separators, and other plant accessories. — *The Swartwout Co., 18511 Euclid Ave., Cleveland 12.*

Industrial Tape

Original and unusal catalog is in the form of five file cards conveniently held together in cardboard folder. Cards are provided for "general purpose tapes, electrical tapes, special purpose tapes, and general information." Across each card are sample strips of tapes described, along with technical specifications and general information on uses.—*Polyken Industrial Tape, Dept. of Bauer & Black, 222 W. Adams St., Chicago 6.*

Air Conditioner

Designed for heating, cooling, ventilating and filtering multiroom installations, air-conditioning unit is said to be practical where space and cost of duct systems is prohibitive, or in new buildings where number of units required may be more economically installed in preference to a central air-conditioning system. Bulletin 1149 lists performance data and specifications. — *Marlo Coil Co., 6135 Manchester Rd., St. Louis 10.*

Power Sweeper

Cleaner designed to keep air free of dust as it vacuums, is covered in bulletin. Advantages claimed for unit are easy and smooth operation, thorough sweeping, and ability to operate at top capacity indefinitely. — *Wilshire Power Sweeper Co., Glendale 4, Calif.*

Miscellaneous

Gas Analysis

Well-bound 60-page booklet gives price lists, descriptions, sketches, and photos of apparatus used for analysis of various gases. —*Fisher Scientific Co., 635 Greenwich St., New York 14.*

Corrosion Wall Chart

A 12x19 card to hang on plant or office walls gives corrosion resistance information for several kinds of stainless steel tubing and pipe.—*The Carpenter Steel Co., Alloy Tube Div., Union, N. J.*

Selecting Instruments

Information on how to select electrical measuring instruments is provided in 30-page instrument booklet. Complete line of portable, switchboard, panel, recording and socket instruments are described and illustrated, with functions of each explained.—*Westinghouse Electric Corp., Box 2099, Pittsburgh 30.*

Conserving Management

Entitled *Management by Exception*, pamphlet outlines method whereby management men can conserve time and talent through use of visible files.—*Remington-Rand, Inc., 316 Fourth Ave., New York City 10.*

Conveyor Film

Two-reel talkie gives typical conveyor applications in 14 different industries, including bottling plant, cracker bakery, brewery, and bread bakery.—*J. S. McCullough, Sales Promotion Mgr., Lamson Corp., Syracuse, N. Y.*

Free Literature
New Quick Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then turn to the Reader Service section inside the back cover, where all items are listed by pages under the heading, "Editorial: New Technical Literature"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items desired, sign at the bottom, and mail. No postage needed.

IT'S TIME . . .

again . . .

TO WAKE UP SCRAPPY!

Scrap's getting scarce again . . . compared to the amounts we need . . . and it's up to *all* of us to *help* produce enough steel.

107,000,000 tons of steel is the present rate of production in 1951 . . . 119,500,000 tons is expected in 1952.

Last year, 1950, we produced 97,800,000 tons.

All that extra steel—enough to take care of *both* military and civilian needs—calls for *more scrap iron and steel.*

Scrap Inventories Are Alarmingly Low

While steel mills are producing at a greater rate than ever, scrap inventories have dwindled. Many mills are operating on a hand-to-mouth basis with shut-downs threatened unless we furnish more scrap.

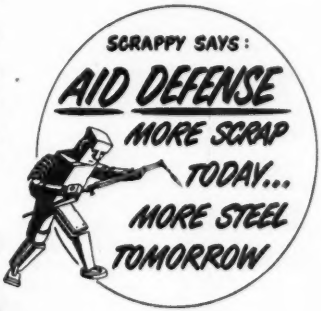
We *do* have the scrap. It's everywhere, not just in the form of *production* scrap—the "leavings" of machining, normally turned over to scrap dealers . . . but also in the form of *idle* metal: obsolete machines and tools, no-longer-usable jigs and fixtures, gears, chains, pulleys, valves, pipe, abandoned steel structures, etc.

We must have this *idle* metal to keep the furnaces running.

Please cooperate. Set up a Scrap Salvage Program in your plant—*now.* For a complete plan on "how to do it", write for booklet "Top Management: Your Program for Emergency Scrap Recovery". Address Advertising Council, 25 W. 45 Street, New York 19, N. Y.

Why Do We Need *Scrap?*

Steel is made half from pig iron, half from scrap. With production on the increase, more scrap must be purchased. And it's up to you to "dig it out" and sell it.



NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by

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330 WEST 42nd STREET NEW YORK 18, N. Y.

PUBLIC SERVICE PROJECT · THE ADVERTISING COUNCIL

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Actual field tests show that 109 BOX-WELD'S extra speed, amazing mileage, and ability to handle a great variety of cases, has cut case sealing costs as much as 65%! It is consistently out performing even expensive resin emulsions in many cases. New 109 BOX-WELD is ready to use, NEVER requires dilution. It bonds fast (15 to 20 seconds compression) even on tough, springy flaps . . . works equally well on machine or by hand . . . on all types of cases.

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For the Food Processor

CARROT OIL makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

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205 Broad St., South Whitley, Ind.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., Inc.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

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FOR HOT SURFACES

HEAT-REM H-170 Aluminum Paint — *stays on where other paints burn off*

Silicone base fuses with surface metal. For heat lines, condensers, ovens, engine heads, mufflers, radiators, exhaust manifolds . . . all extra hot surfaces.

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STANDS 50,000 LB. LOADS 60 seconds after application

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FLOOR RESURFACER

No production delays. Just prime, fill, tamp—over wood, concrete, steel for new floor or patch. Write for free book!

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Specializing in:
Designing, Estimating and Engineering of New and Modernizing of Old Food and Chemical Plants and Processes.
Internationally Known.
Write P.O. Box 348
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Consult these SPECIALISTS
Let them save your time by bringing their board experience in their specialty to bear on your problems.

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Alcohol - Dry Ice - Waste
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Food Consultants and Analysts since 1920
James J. Winston, Director
Cereals Eggs Macaroni Noodles Chocolates Oils Vitamins—Drugs U.S.P.—N.F. Assays Filth—Bacteriological tests Sanitary Inspections Food and Drug Libels, Expert Testimony.
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Chemical and biological analyses of food materials and products. Food plant design, inspection, process examination and control. More than 75 years of experience serving the food and beverage industries.
Write for bulletin
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Bernard L. Oser, Ph.D., Director
Research, Analyses, Consultation for the Food, Drug and Allied Industries
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Research Chemists and Engineers
Organoleptic Panel Testing, Formulation and Stability, Protective Packaging
We have a wealth of applied research for profits, production, available to the food industries.
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Food Technologists and Engineers
Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.
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Chemists — Bacteriologists — Food Technologists
Specialists in Canned and Glassed Foods
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Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Libels, Expert Testimony
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REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

EXCEPTIONAL OPPORTUNITY for man thoroughly experienced in Vanilla Beans, buying, selling, grading, etc., to head department in old established firm. Attractive salary to right man to take charge of expanding business. Our associates know of this advertisement. Replies confidential. P-2249, Food Engineering.

FOOD-DAIRY Technologists with sound college training and commercial experience in food processing sought by large national organization for openings in the middlewest. Background, aptitude, and performance may lead to laboratory, quality control, production supervision, and/or research and development. Please submit comprehensive personnel abstract covering experience and technical training as well as recent photograph. P-2189, Food Engineering.

PRODUCT DEVELOPMENT Group Leader to supervise food research unit in nationally known company. Must have broad experience in chemistry, food technology, or engineering. Be able to plan and coordinate research program, allocate assignments and direct work of technical personnel. Successful record of new products development desirable. Submit detailed resume of training and experience in first letter. Excellent opportunity. P-2345, Food Engineering.

TECHNICAL SERVICE Man (New York) to act as liaison representative between research and sales executives. Prefer Ph.D. in nutrition, biochemistry, or food processing field. Submit detailed resume of training and experience in first letter. Excellent opportunity with nationally known company. P-2348, Food Engineering.

WANTED—PICKLE Maker and Processor, experience essential, technical background helpful. Location Western Canada. Applicants state age, experience and salary desired. Reply P-2150, Food Engineering.

CANNING TECHNOLOGIST. B.S. Degree. Several years citrus experience desirable. For technical sales work in Florida. Advise training, experience, salary, etc. P-2374, Food Engineering.

SELLING OPPORTUNITIES OFFERED

NATIONALLY KNOWN manufacturer of Bottle Conveyors, Unscramblers and allied equipment, requires experienced representatives now carrying related lines. Must be experienced in this field. RW-2202, Food Engineering.

SELLING OPPORTUNITIES OFFERED

SALESMAN NOW Calling on Industrials, Utilities, Institutions, Hotel Chains, State, Municipalities, Government Agencies, etc. Carry Brand new Silicone Resin type Transparent Waterproofing for masonry. High additional income possible. Attractive commission. State lines now carrying. Territory: Mass., Maine, N. H. & Vermont. SW-2342, Food Engineering.

SALESMAN TO Sell Jams and Jellies. Must have what it takes to sell. New York City. Salary and Commission. Replies will be treated confidentially. SW-2360, Food Engineering.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

(Continued on page 226)

FOOD TECHNOLOGIST
With plant experience, preferably in citrus processing, for applied research position with long established California firm. Strong background in biochemistry and microbiology desirable. Age 30-40. Please send resume including age, education, experience and salary desired.
P-2082, Food Engineering
68 Post St., San Francisco 4, Calif.

CHEMICAL ENGINEER
Large flour milling company wants Chemical Engineer for research in dry cereal processing, age 30-40. Must be able to conduct independent research with minimum supervision and cooperate with production personnel. Previous grain processing experience desirable. Write giving details of experience, education, salary requirement, to
P-2325, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

SALESMEN
To Travel New York, Penna, New England
To sell wholesale trade for established manufacturer of soda fountain products. Salary, expense and commission. Must be men of high calibre with car. Give full details in first letter as to background. All replies will be held in strictest confidence and no inquiries will be made without permission.
SW-2357, Food Engineering
330 W. 42 St., New York 18, N. Y.

SERVICE ENGINEER FOOD INDUSTRIES
Nationally known manufacturer of processing materials has opening for a man with production experience in food processing (Dairy, Meat Packing, Canning, Bottling, Baking) for field sales and service work in all types of food plants.
If you have had experience in the food processing industries and are interested in a position which will take you in a sales and service capacity into the leading food plants in the country to aid in their production.
Reply giving full details of education, experience and personal status to Box F. E. #1, F. B. Johnston, 117 Liberty Street, New York 6, New York.

CHEMISTS
Packaging field experience preferred. Large well-known concern located New York City has opening for B.S. graduate with minimum of one (1) years experience in Laboratory work. Salary commensurate with experience and qualifications. 5 day week. Submit detailed resume of experience, education, age, present salary, etc.
P-1964, Food Engineering
330 W. 42nd St., New York 18, N. Y.

RESEARCH CHEMISTS
Openings for B.S. graduates, with Laboratory experience, with long established nationally known concern located New York City. Experience in food field preferred. Experience in products development also desirable. Salary commensurate with experience and qualifications. 5 day week. Submit detailed resume of experience, education, age, present salary, etc.
P-1961, Food Engineering
330 W. 42nd St., New York 18, N. Y.

FOOD CHEMIST
better than average opportunity. Middle West. Salary no object for qualified man. To take complete control of processing Oleoresins and Essential Spice Oils.
P-2060, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to USDA standards
h. Mold Counting and Insect Examination

RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
PREPARATION OF SALADS
PIE AND PASTRY MAKING
CAKE DECORATING
STUDY OF MEATS

MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Foreladies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS

Box 383 CORAL GABLES 34, FLORIDA
Telephone: 83-1301

FOOD CHEMISTS
JR. AND SENIOR

Research Dev. Ph.D. one exp'd "candy" mfr. pref. under 40 ..... $7,200
Group Leader—Ch. Engrg. deg. One with bus. administration educ., pharmaceutical b'kgrd $7,500
Many Jr. Positions
Call, write or wire:—Gladys Hunting (Consultant)
DRAKE PERSONNEL
7 W. Madison St. Chicago 2, Ill.

POSITIONS WANTED
(Continued from page 225)

CHEMICAL ENGINEER with 2½ yrs. experience in food field. Age 28, single, M.S. in Ch. Eng. and biochemistry. Desires production or processing. Available immediately. PW-2291, Food Engineering.

FOOD TECHNOLOGIST, 30, married, veteran, B.S. (1950) Univ. of Calif. Presently doing quality control in related field seeks position in food processing. Metropolitan New York. PW-2239, Food Engineering.

FOREMAN, AGE 36, 16 years experience with one of the largest packers of soups, spaghetti and pork and beans. Thorough knowledge of preparatory, processing, filling and sterilization. Will relocate. PW-2255, Food Engineering.

HIGHTYPE EXECUTIVE, specialist in Margarine and Milk Products of finest quality; seeks greater opportunity for outstanding ability. PW-2116, Food Engineering.

PLANT MANAGER — Inventive, resourceful executive, eleven years exceptional experience. Presently employed by mfr. of nationally advertised confectionery products as Plant Manager with complete supervision of factory:—labor, production, maintenance. Proven ability to stimulate production, develop labor-saving devices, handle labor, build company morale. Experienced in labor relations, negotiating with unions. Hardworking, enthusiastic, enjoy a challenging situation. Age 41, married, $15,000. PW-2207, Food Engineering.

ESSENTIAL OIL and Flavor Chemist—experienced in manufacture, assay, and application of essential oils, oleoresins, etc. PW-2377, Food Engineering.

FOOD CHEMIST—30, MS., previous experience in research and development, quality control systems, management. PW-2380, Food Engineering.

SELLING OPPORTUNITY WANTED

SALES EXECUTIVE — 40, with enviable achievement record seeks new affiliation by Jan. 1st. Food field background. SA-2271, Food Engineering.

PATENTS

CONSULT: Z. H. POLACHEK.
Reg. Patent Attorney, 1234 Broadway, New York 1, N. Y.

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FOOD MANUFACTURING AND PROCESSING PLANT IN ATLANTA, GEORGIA

Located on 5 acres of land; room for expansion. 101,490 square feet of buildings including air conditioned offices and cold storage space. 1, 2, and 3 story modern concrete and brick construction. Best railroad and truck facilities; 400 feet spur track. Paved parking facilities for 100 cars. Now occupied by Kraft. Occupancy soon. Here is a modern plant that you could not build today under present conditions.

Write today for illustrated, descriptive brochure. Consult your broker, or write

ADAMS-CATES CO.
Realtors
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FOR SALE

Modern Pineapple and Tomato Cannery

Built 1951

All stainless steel equipment and product lines—Plaudler Glass Lined Evaporator with stainless coils.

400,000 Case Capacity

Good labor—25¢ hourly wage. Abundant Raw Material. Efficient low cost plant. Very low taxes.

$300,000 TERMS

For information, write or cable—

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TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pins, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351,
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FOOD PLANT WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
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233 Broadway, N. Y. 7, N. Y. BA 7-1819

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TRUCK TERMINAL or WAREHOUSE

U. S. Route #1 Orange, Conn.
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Brick Building 130'x150' on Lot 265'x540' Office 50'x40'. Center Loading Platform 50'x10'. Two Bays 40'x10' and 36'x10' 20' Overhead Doors—All Under Cover. Steam Heated Blower System—Driveway & Parking Area around entire Bldg.—Built in 1946.

(Further details on request)

ORANGE PROPERTIES, Inc.
P. O. Box 1135 New Haven, Conn.

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ESTABLISHED PICKLE-PLANT
STOCK AND EQUIPMENT
WRITE FOR DETAILS
BO-2338, Food Engineering
68 Post St., San Francisco 4, Calif.

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MARGARINE FILLERS

4—Allbright-Nell, complete with conveyors, motors, speed reducers, sealers, Pyrometers and S.S. overflow tanks. Used for manufacture of 1 lb. polyethylene squeeze-pack margarine. Purchased new 1948.

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Including: Sterling, 70# peeler
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Excellent Condition, Priced to Sell

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McGRAW-HILL PUBLISHING COMPANY, INC.
By J. A. GERARDI, Vice Pres. & Treas.

Sworn to and subscribed before me this 6th day of September, 1951.
[SEAL] ELVA G. MASLIN
(My commission expires March 30, 1952)

A STITCH IN TIME . . . *or* THE CRY OF "WOLF!"

In these days of emergency the fable of "A Stitch in Time" should be an object lesson. The growing scarcity of industrial materials drained off by military needs reflects the coming unavailability of equipment. It means you had better "sew up" your machinery requirements NOW.

The story of the boy who cried "WOLF" many times in jest and finally in earnest; only to remain unheeded is very well known. But American industry is getting "loaded for BEAR" a different species of animal. Prepare YOUR plant for top production. Our tremendous industrial capacity is a weapon no other country can match. It is our GREATEST arm.

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Juice and Fruit Packing
Vegetable Processing
Potato and Chip Plant
Frozen Food Processing
Preserves and Syrups
Brewery—Distillery—Winery
Margarine—Lard—Shortening
Peanut Butter—Mustard
Pickles, Salad Dressing
Meat—Dog Food—Poultry
Oil Solvent—Extraction
Fish Processing—Canning
Cheese and Spices
Candy—Chewing Gum
Macaroni—Spaghetti
Coffee Roasting—Packing

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New and used Double Ribbon Mixers from 200 lb. to 3000 lb.
Dough Mixers, jacketed and unjacketed; single and double arm in all wanted sizes
Vertical Mixers, jacketed and unjacketed for every purpose
Philadelphia 2 Speed Reduction Drives; ratio 20.1; 1

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Eppenbach, Premier, Bartlett-Snow, Cherry-Burrell, Charlotte, Manton-Gaulin, Case, Union, Marco from fractional horse power to 50 H.P.

MILLS, CUTTERS, CHOPPERS, SLICERS

Hammermills for pulverizing and grinding; 3 H.P. to 100 H.P. of standard makes
Roller Mills for grinding pastes, nut meats, grains, cereals and other materials
Dicers, Slicers, Choppers by Urschel, Sterling, Anderson, others

PULPERS, JUICE EXTRACTORS

Langsenkamp, stainless steel EZ-Adjust Model B Pulpers

The FMC

RENTAL-PURCHASE PLAN OFFERS MANY ADVANTAGES

Minimum cost outlay for short contract, pilot plant or experimental product.

Monthly rental fee charged up as running cost, permits the equipment to pay for itself.

The rental period also serves as trial period for the equipment. Answers the questions: is it applicable for my production; is it in good condition; is it worth the money; THEN you can determine whether to return it, or finish paying for it or to extend the rental period.

Additional Details on Request

Chisholm Ryder Model B Stainless Juice Extractors
Indiana Stainless and Monel Brush Finisher
Mt. Gilead Hydraulic Fruit Press; 24" x 24" with hydraulic pump, motor; self contained unit

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Devine, Buffalo and Stokes Cabinet and Shelf Dryers for use with steam, gas, electricity—with or without vacuum
Rotary Drum Dryers some in stainless, nickel, steel; cored drums for heating or cooling; various sizes available
Procter and Schwartz continuous type Apron Dryers

CENTRIFUGAL EXTRACTORS AND FILTERS

A. T. & M. Centrifugals; others by Tolhurst, Fletcher, De Laval, Sharples centrifuges

FILTERS AND FILTER PRESSES

Also, Ertel, Scientific Disc and Screen Filters with non-corrosive contact parts
Shriver and Sperry Plate and Frame Filter Presses in wood, iron, aluminum, rubber covered, bronze from 12" to 42"
Oliver Sweetland Pressure type Filters from No. 1 to No. 12

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2 Type 316 Stainless Steel 50 Gal. Reactors; Jacketed and Agitated
Stokes 500 Gal. Stainless Steel Evaporator with barometric condenser
Rogers 6' Stainless Steel Vacuum Pan with accessories
250 Gal. Aluminum Jacketed Vacuum Pan
650 Gal. Copper Jacketed Vacuum Pan 54" x 37" straight side
Dopplop Cast Iron Jacketed Reactor; 40" x 60"
Pfaudler 5000 Gal. Vertical Jacketed Steel closed vessel; 9'6" x 9'10½"
3500 Gal. Jacketed and Agitated Reactor; 200# ASME Coded vessel; 16'6" x 16' with agitator, motor, condenser and pump
Swenson Quadruple Effect Steel Evaporator with spare body and complete accessories
Zahm & Nagel Continuous Concentrator, 2500 pounds per hr. evaporated
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Standard FMC and Berlin Chapman Retorts; 40" x 60" and 42" x 72", also 42" x 96" vertical and horizontal
4 Horizontal Retorts 5' x 14' with tracks, capstan closing doors
Climax Sterilizer; rectangular 42" x 48" x 8'; steam jacketed

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Syphon Fillers, straight Line and Rotary for light, easy flowing liquids
Vacuum Fillers for materials of medium and heavy viscosity; semi automatic and fully automatic . . . straight line and rotary
2 Horix Stainless Steel Gravity-Vacuum Fillers, 14 stem
Filler Machine Co. and Elgin Piston type Fillers from 1 to 11 Spouts

If you plan to visit New York at the time of the Chemical Show, your are cordially invited to drop in at the First Machinery Suite No. 1033 at the Belmont Plaza Hotel, Lexington Ave. at 49th St. adjacent to the Grand Central Palace.

Food Machinery Corp. Can Fillers for Soups, Pea and Bean, Corn, etc.
Stokes and Smith and other standard make auger type fillers for powdered and granular material

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INSIDE and OUT

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Products and literature in this issue are listed on these pages. There are two indexes: (1) editorial items on new equipment, new plant and packaging supplies, new literature; and (2) products advertised.

WHAT THE NUMBERS MEAN

Editorial Items: Numbers on postcard correspond with those in the index below.

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

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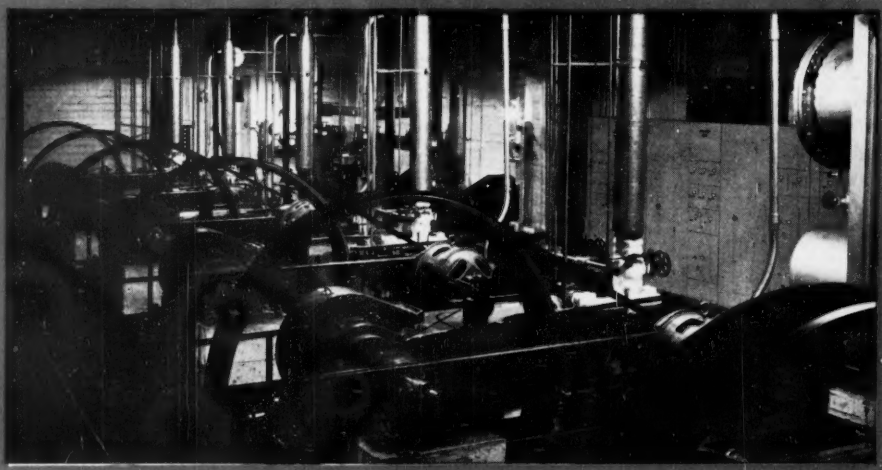

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TEXACO

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